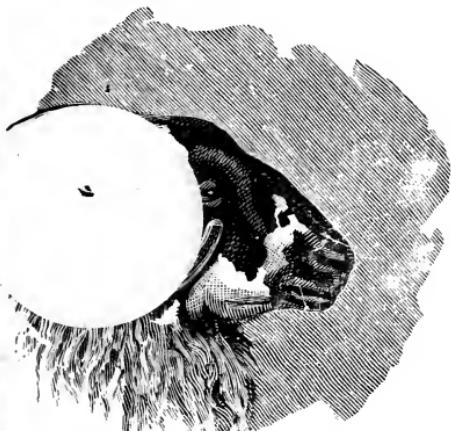


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THE SHEEP

HAMPSHIRE DOWN RAM,



SHEEP :
DOMESTIC BREEDS
AND
THEIR TREATMENT

New Edition

REVISED BY JAMES SINCLAIR
EDITOR OF "THE LIVE STOCK JOURNAL," ETC.

THE VETERINARY SECTION REVISED
BY
A. H. ARCHER, M.R.C.V.S.

WITH ILLUSTRATIONS

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PREFACE.

EARLY in the present century, when interest in the breeding of live stock became more general than it had previously been, the demand for information on the subject was supplied by Messrs. David Low, Wm. Youatt, W. C. L. Martin, and others. The works of Low and Youatt were large and expensive; those of Martin were cheap and popular. Martin's little books passed through many editions, and, from time to time, were revised and modernised. They form the foundation of the present "Popular Live Stock Series"; but in 1893 they were so thoroughly overhauled that very little of the writing of the original author remains. Consequently his name has not been retained on the title page of "Cattle" and "Sheep," as the books have been rendered practically new. They are now published in the belief that, in view of the increased importance of live stock in the farm economy of the United Kingdom, they will be helpful in instructing beginners as to the characteristics and capabilities of the various improved breeds and in giving plain hints as to management and diseases; while they will also serve as introductions to the more extended studies of the subject that are to be found in the "Live Stock Hand Books," brought out by the same publishers.

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SHEEP.

CHAPTER I.

ORIGIN OF SHEEP ; THEIR NUMBERS AND VALUE IN THE UNITED KINGDOM.

THE domestication of the sheep occurred at a period so early in the history of civilisation that no records exist to show the source whence was derived this important variety of live stock, whose development has been closely associated with the progress of the human race, and with the origin and growth of some of our greatest industries. Darwin, who was not easily frightened at the difficulties that often beset the path of the patient investigator, after recording a few of the theories that prevail as to the origin of the domesticated sheep, frankly confessed that "under such a hopeless state of doubt it would be useless for his purpose to give a detailed account of the several breeds." ("Animals and Plants under Domestication," page 98.) We may, however, mention that the classification of sheep usually adopted by naturalists is as follows : 1st, *Ovis Ammon*, the Argali of Asia ; 2nd, *Ovis montana*, or Rocky Mountain sheep ; 3rd, *Ovis tragelaphus*, or bearded Argali ; 4th, *Ovis musmon*, the Musmon, or Moufflon, which inhabits the lofty regions of the Caucasus. There are, besides these, other wild species that have been noticed and described by travellers ;

and a fifth division has been added in the *Ovis aries*, or domestic sheep, including the numberless varieties that are to be found under the care of man all over the world. It is this last description with which alone we are now concerned. Both the place of origin of the domestic sheep and the stock from which it was evolved are matters of dispute among scientists. As to the former, there are a number of converging lines of evidence which seem to indicate that its original habitat was somewhere in the highlands of Central Asia, in the neighbourhood of Afghanistan, and that from this centre it spread in every direction along with the migrations of early man. The existence alike in Asia, Europe, Africa, and America of those wild creatures, such as the Aondad, the Argali, and the Moufflon, which possess a similar affinity to the sheep that the wolf does to the dog, has led some naturalists to suppose that this may have been the source from which the domestic sheep was developed by cultivation and breeding. Certain peculiarities, however (as Dr. F. H. Bowman remarks), seem to indicate that there is a much greater probability that all these animals themselves may, along with the domestic sheep, have had in the remote past a common ancestor from which they have diverged in different lines during the long course of prehistoric ages. It will be remembered that among the earliest Biblical references Abel was described as "a keeper of sheep." The Bible story is, indeed, full of allusions to the pastoral occupation of the ancient people whose history it records, and some of the finest of its poetry and most pathetic of its illustrations are based upon an intimate knowledge of the lives of shepherds and the habits of sheep.

But our theme now is the more prosaic one of tracing the improvement of the British breeds of sheep, and showing the importance of shepherding to the agriculturists of the country. It is not known at what period of her history the cultivation of sheep was commenced in Britain. Even prior to the Roman occupation, attention seems to

have been devoted to breeding them, as the bones of sheep mixed up with those of deer, wild cattle, and other animals of the chase are frequently met with in the tumuli which abound in many districts. Whether these sheep were most prized for their flesh or for their fleeces cannot now be positively determined, but from the fact that horns are never observed among the deposits, the presumption is that they were a domesticated race. When the British Islands were first visited by the Romans, the early inhabitants appear not to have been wholly unacquainted with the manufacture of coarse woollen fabrics, most probably of felt, although it was not until some time after they had been under foreign subjection that woollen manufactures occupied a prominent place among the industries of the country. A writer in Morton's "Cyclopaedia of Agriculture" says : " However meagre and mixed up with the fabulous the records of the long period of Roman dominion may be, they are sufficient to prove the importance that was attached to the cultivation of the sheep. British woollen goods were well known at Rome, and were much prized for their extreme fineness. There is no evidence to show that the raw material was imported from other countries, but strong presumption, amounting almost to certainty, that it was derived from native flocks. The town of Winchester, the quality of whose stuffs is described as 'rivalling the spider's web in fineness,' became the great seat of the manufacture. To whatever degree of importance the woollen industry had attained when the Romans finally withdrew from the island, to its long occupation by them must be attributed in a great measure the early and successful efforts put forth in the improvement of British sheep." There can be little doubt that the breeding of sheep was from a very early date prosecuted with more skill by the inhabitants of the British Islands than that of any other variety of live stock.

A few statistics may now be given to show the importance of sheep at the present time. In 1872, the number of

sheep and lambs in the British Islands was 32,247,000; in 1882 (owing to the devastations of liver fluke disease following the wet seasons of 1878 and 1879), the number had fallen to 27,448,000; but in 1892, it had again increased until it reached 33,643,000. The following shows the numbers in the various divisions of the country in these years:

Years.	England.	Wales.	Scotland.	Ireland.	Total (including Channel Islands).
1872	17,912,904	2,867,144	7,141,459	4,262,117	32,247,000
1882	14,947,994	2,517,914	6,853,860	3,071,493	27,448,000
1892	17,993,756	3,197,501	7,543,447	4,827,702	33,643,000

The value of sheep and wool produced in the United Kingdom has declined a good deal owing to the low prices that are now current. It used to be estimated at about £30,000,000 annually. Professor W. Brown, in his book on "British Sheep Farming," published in 1870, gave the number of sheep at 34,532,000, which he calculated would yield in one year 154,182,750 lbs. of wool. This, valued at 10d. per lb., represented an annual return of £6,425,000. He further reckoned that 11,510,000 sheep would be killed annually in the United Kingdom. Taking an average carcase at 65 lbs., we had thus 748,150,000 lbs. as Britain's slaughter of her own mutton. At about 8d. per lb., this came to £25,000,000 of annual value for mutton. A later estimate was furnished by the late Mr. J. Algernon Clarke in his essay on "Practical Agriculture," contributed to the "Memoir of the Agriculture of England and Wales," prepared by the Royal Agricultural Society of England for the Paris Exhibition in 1878. Mr. Clarke gave a total of 21,492,000 sheep one year old and upwards, yielding 119,473,000 lbs. of wool, or an average of about 5½ lbs. per fleece. At ten years' average price of English wool, the value of the annual product of wool in the United Kingdom was £4,604,000. The number of sheep and lambs killed annually was taken in 1878 at 9,000,000, giving 44,500,000

imperial stones, which at 9*d.* per lb. was equal to £23,362,500. Thus Mr. Clarke's estimate of the annual value of mutton and wool in 1878 was about £28,000,000. An estimate for 1892 brings out the value of the sale of native sheep and wool at about £26,000,000. In that year the total clip of wool was estimated at 153,380,321 lbs. The gross value of sheep and lambs in the United Kingdom in 1892 has been put at £35,745,483 (33,642,808 head, at an average of 21*s.* 3*d.* per head), this showing a heavy fall from £50,720,156 in 1891, when the value per head of 33,533,988 was 30*s.* 3*d.*; and in 1890, when it was 36*s.* 3*d.*, equal to £57,396,790. The fall in values was to some extent caused by the increased imports. In 1871 the value of sheep and fresh mutton imported was £1,790,000; in 1881 it was £2,192,000; and in 1891 it had risen to £4,082,000. There were, however, other temporary causes for the decline in the year mentioned, such as a bad spring, and short supply of food, which caused a glut in the markets, and a consequent depreciation of values.

In comparison with the size of the country, the number of varieties of sheep which the United Kingdom contains is wonderful. The circumstance is due to the diversified physical conditions which prevail, and to the skill of breeders in having developed numerous types to suit the varying requirements of soil, climate, and food. Two sentences from Darwin concisely illustrate the main principles that operate in the moulding of breeds of sheep. "Sheep," he says, "are perhaps more readily affected by the direct action of the conditions of life to which they have been exposed than almost any other domestic animal." Again: "That methodical selection has effected great changes in several breeds of sheep no one who knows anything of the subject entertains a doubt." As to the first point Professor W. Brown observes: "The physical character of a country, the nature of the soil, drainage, temperature, rainfall, and vegetation have marked influences on the various breeds of sheep, not only on those

introduced from different habitats, but even on those whose constitutions have been inured to the particular ranges where any change of climate may be brought about." The sheep is remarkable for its capacity of adaptation to the circumstances that surround it, and we have certain varieties that seem to have been shaped chiefly by the nature of their environments. There are also numerous instances of failure of attempts to force sheep to thrive under circumstances that are unsuitable to particular breeds. Physical characteristics of the country affect the constitution of the sheep, the quality of the meat, and the growth of the wool, and it is contended that they have contributed in perhaps a greater degree than methodical selection on the part of breeders to the production of many of our existing races. Professor Tanner, in an able paper on the "Influence of Climate, etc., on Sheep," published in the Journal of the Royal Agricultural Society of England in 1869, has some suggestive remarks on this most interesting subject. He alludes to the constitutional vigour of the mountain breeds of sheep, and as to the quality of their meat remarks: "In this respect our mountain sheep hold an indisputable pre-eminence, for no mutton surpasses it, neither does any equal it unless produced under somewhat similar circumstances. The quality of the meat depends upon the lean portion being tender and charged with a rich juice; and these results can only be obtained from an animal of mature age, of active habits, and fed upon short, sweet herbage. By activity of body the muscles are brought into exercise, and a healthy growth is the consequence. The food being short and sweet compels the sheep to take plenty of exercise to gather their supplies, and the herbage being sweet and nutritious, in contradistinction to that which is coarse and immature, renders the meat savoury, the gravy dark and rich, and the meat palatable and digestible." We may here interpolate the observation that modern practice and tastes have dealt a heavy blow at "mature" mutton; this may suit a few epicures, but the

great buying public prefer tender, fine-grained meat cut from young sheep. Mr. T. Ellman, son of the great improver of the Southdown breed of sheep, says: "The training, the character and history of any race of animals, the influence that situation, soil, and climate, as well as management, exert in the appearance, constitution, and disposition, must not be overlooked. So treacherous are these agencies that experience gained in one county may be of little avail in another; the Norfolk man transferred to the Southdown hills becoming, as it were, a child again, and the Southdown man being equally at sea if removed to Leicestershire. So great, indeed, is the effect of soil and climate, that the fine flavour of Southdown mutton may be changed in time to the coarse, tallowy meat of the Leicester or other long-woolled sheep. Nor will the flesh alone be interfered with, but the wool and every other feature will become assimilated to those of the natives of the different localities." These are very important influences in connection with sheep-breeding, and may, in fact, be said to lie at the root of the science. Nor ought we to overlook the causes that compel breeders to endeavour to change the characteristics of their sheep. Thus variations in the descriptions of wool required for the manufacture of fabrics have their resulting effects in the development of the type to produce the needed quality of fleece. Then the taste of consumers of mutton has to be consulted, and this frequently revolutionises the aims of breeders. This latter influence was forcibly set forth by the late Mr. Wilson, Edington Mains, who wrote: "Very important changes in the sheep husbandry of Berwickshire have occurred in my day. Forty years ago every Lowland farm had its flock of Leicester ewes, and now, with the exception of a very few kept for ram-breeding, there is no such thing. About the time referred to, a cross-breed, between the Cheviot ewe and Leicester ram, was universally substituted for the pure Leicester. This change was due in part—and particularly when it was first

adopted—to the fact that ewes of this cross were found to be hardier and more prolific than Leicesters. But from the first it was due in part, and always more so as years passed, to a change in the tastes of our best customers—the miners and mechanics of the north of England. At the earlier period named the largest and fattest mutton pleased them best; whereas now the article that is in demand is a carcase weighing about 20 lbs. per quarter, with a large preponderance of lean flesh. For several years sheep of the first cross between Leicester and Cheviot, or Leicester and Blackfaced, have been worth 1*d.* per lb. more than those with two or three crosses of Leicester blood, and with a consequent larger proportion of fat meat. Farmers, like other traders, have to consult the taste of their customers, and hence their practice of sheep-breeding is not altogether left to their own choice. In Southern England the mutton of the Downs and their crosses obtains a similar preference to that of the larger and fatter long-woolled kinds."

CHAPTER II.

BRITISH BREEDS OF SHEEP—THE LONGWOOLS.

THERE are in the United Kingdom about thirty breeds of sheep, possessing more or less distinctive characteristics. A number of these, in their present form, are of comparatively recent development, and all have been improved and adapted to suit modern needs. We believe, however, as we have already stated, that the systematic breeding of sheep has been carried on in this country for a longer period than has been the case with any other variety of live stock. The evidences are clear that the cultivation of sheep, particularly with a view to the production of wool, is a very ancient branch of rural industry. It was because our forefathers had, during many ages, been careful and skilful breeders of sheep that their descendants were enabled to take the front rank in the world as improvers of these as well as of horses, cattle, and pigs. It will not be possible in this treatise to do more than briefly sketch the progress of the various breeds, and in doing so we may take for notice first the group that, as a rule, conforms to the description of LONGWOOLS ; and as the breed has exercised a wonderfully far-reaching influence in ameliorating other races, we shall begin these descriptions with

THE LEICESTER.

“The formation of the new Leicester breed of sheep may be said to form an epoch in the economical history of

the domestic animals, and may well confer distinction on the individual who had the talent to conceive, and the fortitude to perfect, the design. The result was not only the creation of a breed by art, but the establishment of principles which are of universal application in the production of animals for human food." In these well-chosen words Professor Low, in his book on the "Domesticated Animals of the British Islands," very justly describes the character and value of the work accomplished by Bakewell in establishing the improved Leicester breed of sheep. It would serve no good purpose to attempt to trace the source and origin of the breed or breeds on which Bakewell commenced his operations. Suffice it to say that during the last century a number of varieties of long-woollen sheep, prevailing in Leicestershire and the adjoining counties, possessed many points in common, the differences being such as would be caused by dissimilarity of soil and climate, intensified by the diversified aims in breeding which influenced farmers owning the several descriptions. It appears that what may be called the original Leicester was of the same general type as the Teeswater, the Lincoln, and the Romney Marsh. The old Leicesters were heavy, coarse-grained animals, the meat having little flavour and no delicacy; the carcase was long and thin, flat-sided, and with large bones on thick, rough legs. The fleece was heavy and long, and of coarse quality. The sheep were slow feeders, and when sent to market at two and three years old weighed 100 to 120 lbs. each. The fleece weighed 13 or 14 lbs., and measured from 10 to 15 inches in length. Prior to Bakewell's time, a Mr. Allom, of Clifton, Leicestershire, had a good flock, and sold ram lambs at the then high price of two guineas to three guineas each. To Bakewell, however, belongs the credit, in Professor Low's phrase, of creating the improved Leicester breed by art, and establishing thereby principles universally applicable in the production of animals for human food.

Before Bakewell's time the profits derived from sheep,

especially those of the long-wooled breeds, had depended so much upon the wool that graziers seldom paid further attention to the carcase than to see that it presented a sufficiently large surface for the development of the fleece. In short, with the exception of such an isolated case as that of Allom already mentioned, and perhaps a few others, the wool received all the attention, and the chief object kept in view as regards the carcase was to make it large. It was about the year 1755 that Robert Bakewell, of Dishley, near Loughborough, in Leicestershire, commenced to alter all this. His efforts were contemporaneous with the dawn of agricultural improvement in England, and with the expansion of its industrial resources. The higher kind of farming then inaugurated demanded that live stock should be bred in larger numbers and cultivated in a more scientific manner ; and the increase of the manufacturing population at once afforded a ready market for the increased supplies of beef and mutton. Bakewell therefore endeavoured to lessen the size of his sheep ; to reduce their bone and offal ; to impart symmetry to their shapes, and especially to stimulate early maturing properties. He, in short, set about the origination of a mutton-producing breed, expressing his indifference to the extent or quality of the fleece. Wool was thus a point upon which he placed but a very secondary value ; indeed, he regarded a heavy fleece as detracting from what was his great aim—a ready disposition to make all the food assimilated tend to the accumulation of fat. Even on mutton production Bakewell had distinct and peculiar ideas, which were amply warranted by the circumstances prevailing at the time. The largest and fattest sheep commanded the best price. It was found for many years that to take a small and not overfed joint of mutton into one of the large towns of Yorkshire or Lancashire was to run the risk of having the commodity neglected, for the usual practice was to put a large joint of fat mutton over a dish of potatoes at the workman's table. The meat went to the heads of the family ; the potatoes, saturated with the fat

and gravy, making a savoury meal for the junior members. Thousands in the manufacturing and mining districts were for many years brought up in this way, so that in breeding fat sheep Bakewell had a better warrant than would apply in the present day, when fat is obtained in more palatable and digestible form in butter and its cheaper imitations, and when the working classes, as well as others, prefer to have lean and juicy mutton. Among the few recorded statements of Bakewell (who was not a communicative man) there is one that is mentioned by Mr. Pitt in his "General Survey of the Agriculture of Leicester" (1809), which throws light on his objects. A gentleman said to the great breeder: "Your mutton is so fat that I cannot eat it." Bakewell's rejoinder was: "I do not breed mutton for gentlemen, but for the public; and even my mutton may be kept leaner to suit every palate by stocking harder in proportion and by killing the sheep in time."

Probably there is no better explanation of Bakewell's method of breeding than that which he furnished to his friend Marshall at the end of the last century, and which he thus summarises: "It will most likely come out that no cross with any alien breed whatever has been used, but that the improvement has been effected by selecting individuals from kindred breeds—from the several breeds or varieties of long-woollen sheep by which Bakewell was surrounded on every side, and by breeding in-and-in with this selection, solicitously seizing the superior accidental varieties produced, associating these varieties, and still continuing to select with judgment the superior individuals." Bakewell's sheep soon attained great popularity. His first let of a ram was in 1760, the fee being 17*s.* 6*d.* In 1789 he let three rams for 1,200 guineas for the season. The Dishley Society was established, and by means of it the sheep acquired very high value. Until quite recently Mr. Valentine Barford possessed a flock of Leicesters that had been preserved pure from the days of Bakewell. They were distinguished by great symmetry, and although Mr. Barford did not go beyond his own flock for

his rams, neither the health of the sheep generally nor the fecundity of the ewes was impaired ; his sheep, however, were small.

The Leicesters soon extended all over England, and large numbers were taken to Scotland and Ireland. The ameliorative influence exercised by the breed on all the long-woollen varieties and on some of the short-woollen kinds was very great—the chief features imparted being a tendency to early maturity and the production of a great proportion of fat.

The breed, as has been said, has extended all over the United Kingdom. The county in which the Leicester originated, together with the breed's constitution and general disposition, would point to a naturally fertile and highly cultivated soil as its habitat. Scattered over such a wide range of country the type has varied, not only owing to climatic conditions and the nature of the soil, but also in accordance with the varied objects that have governed breeders in the continual process of selection. In general, as Mr. John Algernon Clarke wrote, it is correct to say that the fore-quarter of the Leicester is remarkably well developed ; the shoulders are wide and sloping, consequently there is no rigidness along the back ; the bosom is deep and wide, and the fore-flank very full. The animal stands close to the ground ; the neck is short, so that the head is raised but little above the line of the back. The neck is full and broad at the base where it proceeds from the chest, but gradually tapering towards the head, and being particularly fine at the junction of the head and neck ; the neck seeming to project straight from the chest, so that there is, with the slightest possible deviation, one continued horizontal line from rump to poll. The ribs are well sprung, and the carcase is very true ; the hips are well covered, but not wide, and tapering to the rump, which is small. The back is well covered with fat. The eye is full and prominent ; the head is tolerably long and fine, and hornless ; the ears are thin and rather long, and the muscular development is

moderate. The legs of mutton are not large, and there is a deficiency of lean meat. With a wonderful capacity for external and rapid development there is little inside fat ; hence Leicesters are not now favourites with the butchers. Their great merit is their early development and accumulation of weight on a given quantity of food. The wethers, when fattened in their second year, weigh 25 to 35 lbs. per quarter ; the fleece 7 to 8 lbs. At the Smithfield Club Shows of recent years, lambs from nine to ten months have weighed 154 lbs., and wethers twelve to twenty-four months old 273 lbs. ; these, of course, being the live weights of animals that have been forced to their utmost capacity.

By a good many breeders the Leicester is still kept in a pure state, and it would be a pity if ever the profits became so small as to permit its extinction ; for among the long-woollen breeds there is none that can be so confidently relied upon for the purposes of improvement. The demand that still exists for the Leicester to cross with other varieties will, it is hoped, prove a sufficient inducement to owners to preserve unimpaired the purity of the breed. It cannot, however, be said that in its pure state it approaches to the position of a general favourite with tenant farmers. The taste of consumers, as we have already explained, has altered very much since Bakewell's time, and they insist upon having better mixed mutton than the Leicester can supply. Then the defective nursing powers of the ewes and the tenderness of the lambs render it unsuitable for rent-paying farmers, although few of them will deny the excellence of the cross, or their indebtedness to the breed and to its founder, Bakewell, for much of the improvement of the general sheep stock of the country.

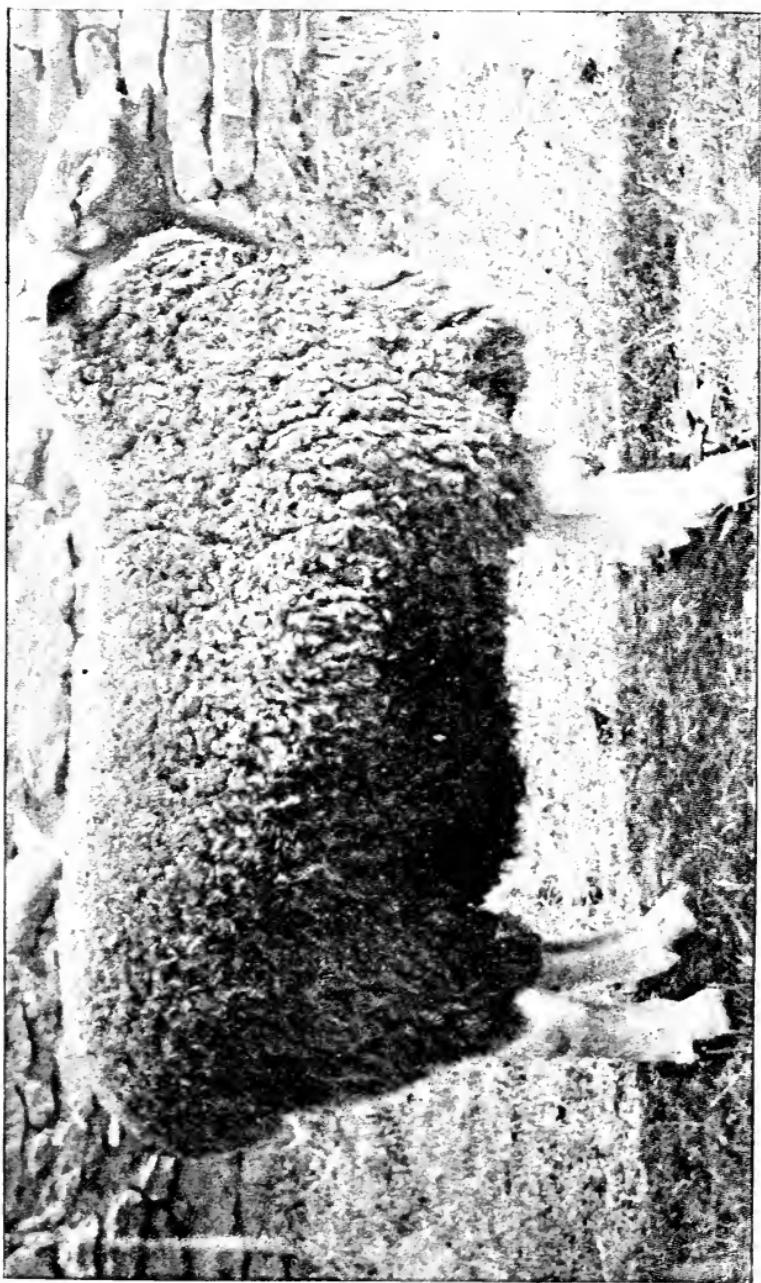
There are, however, several varieties of the Leicester that have been varied in character and type to meet present day needs. This is notably the case in Yorkshire and in the Border counties, where the breeders have been particularly successful in retaining the good qualities of the Leicester, and in incorporating with these a larger

size, a more robust constitution, and a greater proportion of lean flesh.

BORDER LEICESTER.

If the Leicester, as it left the hands of Bakewell, has exercised its chief influence in the improvement of other varieties and has not quite maintained its popularity in its original form, there can be no doubt that the breed known as the Border Leicester, and which is an offshoot of the original Dishley stock, has gone on steadily improving and increasing its territory. The brothers Culley entered the farm of Wooler, Northumberland, in 1767, having migrated from the Teeswater district. They had both been frequent visitors at Dishley, and had imbibed the principles of breeding that were practised by the great master. His sheep were the special subjects of their admiration, and they aimed at doing for the native breed of Yorkshire what he had accomplished for the Leicester. With this view they obtained rams from Bakewell, but it is expressly stated by Young, in his "Annals of Agriculture," that they at no time purchased ewes at Dishley. They, however, when they removed, probably took further north the class of sheep from which the improved Leicester was evolved. They quickly transformed the character of the native breed of Northumberland by the repeated use of Dishley rams, and it is an unquestioned fact that it was chiefly from the Culleys that the sheep came from which the present race of Border Leicesters are descended. Other eminent early breeders were Scott, of Mertoun; Robertson, of Ladykirk; Thomson, of Lilburn; and Grey, of Milfield. Mr. John Grey, of Dilston, was intimately acquainted with the breeders of early days, and in a letter to Mr. Wilson, of Edington Mains, said he had used rams from Mr. Thomson, of Lilburn, and from Culley himself. Mr. Grey hired rams from England, and had three for two years from Lord Althorp, which he described as "perfect as to shape and quality, but on a low leg, with a round, full carcase," and

they were very profitable sheep for feeding. Then he went on to state that in his district all the ewes were sold for breeding another year in Yorkshire, and the buyers liked them to stand upon a higher leg and make a bigger show in the pens at York or Wakefield. "This taste," he said, "prevailed, I think, pretty generally in the Borders, and has operated, together with the effects of climate, in changing considerably the look and character of the Border Leicester sheep from the original of Leicestershire." The Dishley breed were mentioned in the "Agricultural Survey of Roxburghshire," published in 1798, and in this it was stated that there were in the county five or six flocks of the Dishley breed remarkable for the beauty of their shapes, their tendency to fatten, and their heavy fleeces. In the same work it was mentioned that rams of this breed, reared in the county, were hired at from 8 to 15 guineas for the season; ewes tupped at two guineas each, some being brought from different quarters at great expense. Spanish, Herefordshire, and Southdown sheep were also spoken of as being kept pure, and the result of crossing with other breeds was related. The Border Leicesters have been most carefully bred with a view to practical utility, and they are a breed the development of which reflects the highest credit upon the flock-masters in whose hands they have been kept in a state of continued improvement. The rams are usually sold at Kelso in the autumn, and they fetch very high prices. Lord Polwarth's flock at Mertoun is generally at the top of the list, his average for a considerable number of shearlings having been as high as £53 19s. 4d. per head, some of the rams making £195, £160, and £155 each. The points of a typical Border Leicester ram have been stated as follows by the Hon. Henry J. Scott, Mertoun: Head white, hard, and clean cut; eye clear and prominent; nose black; ears well set and free from blue, but black spots do no harm. Neck set well into shoulder, with bold, gay carriage; strong in neck vein; not ewe-necked. Shoulders and chest deep and wide;



LINCOLN RAM.

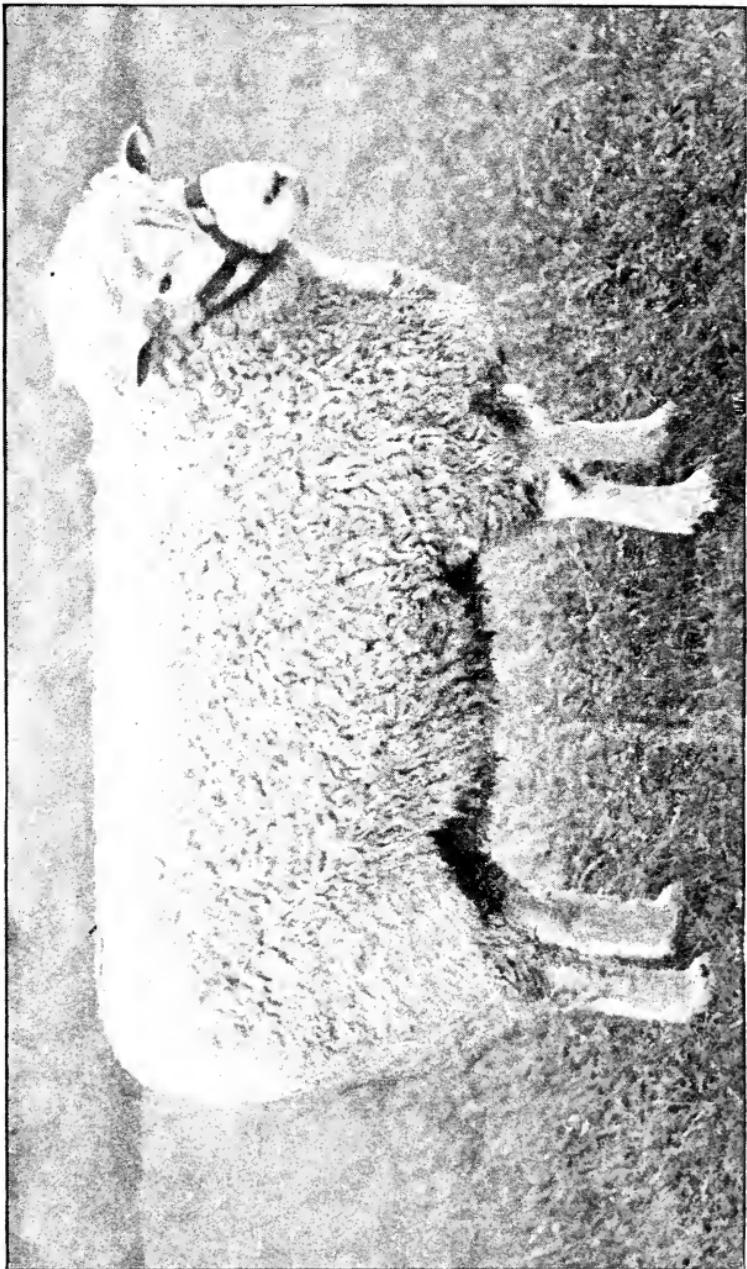
ribs wide and round like a barrel; big through heart; deep in flanks; quarters long and square; light in offal. Bones fine and hard like a deer. Wool "pirly," fine lustre wool, well clad all over in belly and testicles; none on legs or head. General frame should be large and roomy, lines straight above and below; immensely wide; standing up well, yet not leggy, with a free, bold style, and aristocratic expression.

Fat tups at twelve to fourteen months old weigh 23 lbs. to 25 lbs. per quarter. Wool averages 9 lbs. per fleece. The breed is a valuable one in its pure state, and it crosses splendidly with the Cheviot and Blackfaced varieties. The merits of the Border Leicester for crossing with foreign and Colonial breeds are widely acknowledged, and many are exported for this purpose.

LINCOLN.

The old Lincoln appears, as we have seen, to have been the original type from which Bakewell developed the Dishley Leicester. In the earliest books on agriculture which contain descriptions of live stock, the Lincoln sheep is referred to in more or less complimentary terms. Thus Markham, in 1621, alludes to those in the salt marshes as "the largest sheep in England." The animals were of enormous size, and the form was gaunt and somewhat unsightly; still, they had splendid fleeces, which exceeded those of all other breeds in length of staple, viz. 10 to 18 inches, and weighed from 8 to 16 lbs. per fleece; the wool being curly stapled and noted for its gloss or lustre. The old variety has disappeared. After a stubborn fight—among the incidents of which was a wordy warfare between Mr. Chaplin, a Lincolnshire breeder, and Bakewell—the Lincoln men dipped into the blood of the improved Leicester pretty freely, and the coarseness gradually disappeared, the flesh was laid on more uniformly, the sheep attained maturity fully a year earlier, and an aptitude to fatten was induced. The

fleece was slightly diminished in weight, but was improved in quality. This was, indeed, the point in which the Lincoln flock-masters bettered the lesson which they learned from Bakewell—they did not sacrifice wool in the pursuit of flesh and fat. Mr. J. Algernon Clarke, who was a recognised authority on this breed, said the Lincoln now possesses a size, expansion of frame, and nobility of appearance equal to those of the Cotswold, with the compactness of form, quality of flesh, fine countenance, and light offal of the Leicester, while surpassing both for the weight and value of the wool. A frequent weight of wool from a ram is 25 lbs., while as much as 32 lbs. of clean washed wool is recorded; and a good breeding flock will average from 12 to 14 lbs. each fleece. The sheep are very hardy, whole flocks being folded on turnips during the winter months. They are also prolific, about 30 per cent. of the ewes producing twins. The breed is less subject to foot-rot than some of the other varieties. A three-shear wether belonging to Mr. Dawson in 1827 is said to have weighed 92½ lbs. per quarter; a wether killed at Holbeach in 1844 weighed 62½ lbs. per quarter; a ewe exhibited by Mr. John J. Clarke at the Smithfield Club Show in 1846, weighed 62½ lbs. per quarter, and Mr. C. Clarke had at Lincoln in 1827, wether sheep, each of which weighed 62 lbs. per quarter, and yielded 24 lbs. of wool. In 1826, a three-shear wether was killed which weighed 386 lbs.; a two-shear 364 lbs., and a shearling 284 lbs. dead weight. As a rule, however, wethers average 25 lbs. per quarter, and the wool 12 lbs. per fleece. Often, however, the fleece will weigh 20 lbs., and there are instances of 26½ lbs. of wool being clipped. At the Smithfield Club Shows lambs from nine to ten months old average 172 lbs., and wethers from twelve to twenty-four months old 305 lbs. live weight. The breed has fully maintained its position in the county of Lincoln and adjoining districts, while numerous specimens have been exported to Australia and South America, the flock-masters of these countries having found that the Lincoln



COTSWOLD RAM.

increases the mutton-producing qualities when crossed with the Merino, at the same time that it does not detract from the fleece so much as others of our improved breeds do.

COTSWOLD.

Among British breeds of sheep no one is so well entitled to advance "claims of long descent" as is the Cotswold. There is a great deal of evidence to prove the early celebrity of this breed. Such old writers as Camden, Drayton, Stowe, and Speed, in works which appeared during the fifteenth and sixteenth centuries, make distinct allusion to the Cotswold sheep. There are records that in 1437 Cotswold wool was exported to Spain, and that in 1464 and again in 1468, Cotswold rams were shipped to that country, these latter having been presents from the English to the Spanish monarch. The exceptional preference thus accorded to the Cotswold would of itself mark out the race as one of great excellence even at that early period, but we are not confined to such indirect testimony of the value of the breed. Historians and poets agree in bestowing high praise on the Cotswold. Camden (born 1551, and the translation of whose historical work appeared in 1610) describes the Cotswold wool as "most fine and soft," and as being "held in passing great account among all nations." Drayton, the poet (1612), especially notes the "abundant fleece" of the Cotswold, and his "wealthy locks," and Speed (1629) remarks that on the Cotswold hills "sheep are fed that produce a singular good wool, which for fineness comes very near to that of Spain, for from it a thread may be drawn as fine as silk." The habitat of the breed is the tract of low calcareous hills in the eastern division of the county of Gloucester, which was formerly a range of bleak wastes employed in the pasturage of sheep, and much of it in a state of common. These conditions were not favourable to the development of a long-wooled massive breed of sheep, such as the Cotswolds now are, and it has been maintained

by some that the sheep referred to by the old historians were of a short-woollen kind, and that their character has been so completely altered since that they are practically a different breed. We need not, however, discuss this question. More recently the Cotswold sheep has undoubtedly undergone considerable alteration and improvement. About a hundred years ago breeders liberally infused the Leicester blood into their flocks, and Low states that the system of crossing was pursued so extensively that after a time there did not perhaps exist a single Cotswold flock which was not more or less mixed in blood with the new Leicester. The desired objects having been obtained, crossing was to a considerable extent discontinued, and the breed was thereafter cultivated pretty closely within itself. The Leicester imparted more symmetry of form and greater disposition to early maturity, while it did not materially reduce the grand massive frame and abundant fleece of the Cotswold, or impair its fertility or constitutional vigour.

In the prize essay which appears in the first volume of the Cotswold Flock Book (1892), Mr. W. S. Harmer thus describes an ideal Cotswold: The head should be wide between the eyes, and the eye itself full, dark, and prominent, but mild and kindly, and in no way coarse about the brow. The face should be proportionately wide to the space between the eyes, but not too flat, and should run of much the same width to the nostrils, which must be well expanded and somewhat broader than the face, with the skin on the nose of a dark colour. The cheek is full, and, as in the face, well covered with white hair; a just perceptible blue tinge on the cheek and round the eye being rather fancied. The ear long, but not heavy, of medium thickness, and covered with the same short, soft hair; it should be well carried up, while black spots on the point of the ear are not considered objectionable. The top of the head should not be coarse or bald, but covered with *wool*, not hair, and the Cotswold is to be distinguished by a fine tuft of wool on the forehead. The head should be sufficiently

long to save it from being called short and thick, but it should not have a long, lean appearance. Grey faces still crop up occasionally in all the best hill flocks. The neck should be big and muscular, and should be gently curved to enable the sheep to carry the head well up, thereby giving the animal a good appearance. The neck should be slightly smaller at the ears than where it curves from the shoulders. The shoulders should lie well back, and the point of the shoulder should be well covered with flesh, as also the chines. The ribs should be deep, well sprung from the back ; the hips and loin wide and well covered with flesh. The rump should be carried out on a level with the back, giving the animal a square-looking frame ; the leg of mutton well let down to the hock and thick on the outside. The legs, both front and hind, should be straight, moderate in length, and well set outside the body. The pastern joints, both front and hind, should be short. The whole body should have a firm, solid touch (not loose and flabby), and be well covered with a thick-set, long, and lustrous wool.

Cotswold sheep are capable of enduring great hardships, succeeding well in exposed situations, and on nearly all kinds of soil adapted for sheep-farming. They produce a great amount of mutton and wool at an early age ; their rapid maturing properties and disposition to fatten enabling them to be brought to market at from nine to twelve months old, with ordinary feeding, at a weight of from 90 to 112 lbs., while it is not unusual for the best flocks to turn out 120 to 130 lbs. sheep at that age. At the Smithfield Club Shows wethers twelve to twenty-four months old average 298 lbs. (live weight) ; ewes over three years, 275 lbs. ; and lambs under twelve months, 186 lbs. The average weight of the fleece throughout a well-managed, first-rate flock will be from 9 lbs. to 11 lbs. of washed wool. Sometimes the weight of a hogget fleece exceeds 14 lbs. It ought, however, to be added, that the mutton falls short of the best quality, especially when the sheep grow aged, mainly from want of a due intermingling

of fat and lean, and their open, curly fleeces are not at the present day in the foremost rank for length and fineness of staple.

Large numbers of Cotswolds are exported to Germany, the United States of America, and other foreign countries ; their large size and impressiveness causing them to be highly valued for crossing purposes.

ROMNEY MARSH, OR KENTISH.

Although this breed is not well known in England outside the county of Kent, and adjoining portions of Sussex, where it is chiefly maintained, colonists have discovered its merits, and large numbers have been exported, especially to New Zealand. As described in old books, the breed does not appear to have been a very handsome one ; but evidently it was valued in its own district, for it has a very ancient history, and the introduction of fresh blood seems to have been resisted with a good deal of vigour. No doubt, however, there was at one time a careful and judicious infusion of Leicester strains, and these having effected their usual mission, the breed was subsequently kept pure, and so we have a class of sheep which nothing else can dislodge from its stronghold, and which, as we commenced by remarking, is highly valued abroad. The points most desired by breeders are these : As much bone as possible ; a good head, by no means weak, but not of sour expression ; a heavy fleece of fine wool and true Kent character, with as good a carcase as possible. These sheep have to live through their second winter on the marshes without extra food, and contrive to put on meat the while, so that after being shorn, the two-year-olds are ready to draw week by week to supply the local markets, where their mutton is appreciated by the butchers during the summer months as much as is that of some finer sorts. They are essentially grazing sheep, and not winter fatteners, as they dislike

the restraint of folding, and their long wool unfits them for living on arable land in wet weather. At the Smithfield Club Shows wethers from twelve to twenty-four months old weigh alive, 256 lbs.; ewes over three years old, 267 lbs.; and lambs under twelve months old, 167 lbs.; sometimes wethers will weigh up to 300 lbs. The wool is remarkably lustrous and fine, and is in great demand upon the Continent; weight of fleece, 7 to 15 lbs., the average about 9 lbs. In France and Flanders the Kent wool is used in the manufacture of a fabric known as "cloth of gold."

WENSLEYDALE.

The Wensleydale is chiefly cultivated in the north and north-west of Yorkshire, and in parts of Cumberland, Westmoreland, and North Yorkshire. These sheep are directly descended from the old Teeswater, which Culley described as the largest variety in Great Britain, and to which reference has already been made. In 1838, Mr. R. Outhwaite, of Appleton, purchased a big Leicester ram from Mr. Sonley, Lund Court, Helmsley, for the purpose of crossing with his Teeswater ewes. Amongst the produce of this cross was the sire of the ram Blue Cap, which is "the patriarch of the modern Wensleydales;" and from him the great majority of the present breed of Wensleydale sheep are descended. The breed is thus described by Mr. T. J. Other, in the *Livestock Journal Almanac* for 1891: "The Wensleydale is a big, squarely-built, up-standing sheep, with a good wide back, strong neck, good legs of mutton, carrying a fleece of fine silky wool, and having a great aptitude to lay on flesh rapidly. The skin of the face and ears is of a dark blue colour; this blueness of the skin frequently extends all over the body. The most valuable qualities of the Wensleydales are the excellence of their mutton, their size, their hardiness, and their activity. The mutton is of high quality, containing a very large proportion of lean flesh of a fine texture, the

sheep at the same time attaining size as great as or greater than any other long-woollen breed. Their hardiness and activity are best proved by the fact that they are extensively used for crossing with Blackfaced and other mountain breeds. This requires them to be robust enough to bear great extremes of climate, and to be active enough to get about after the ewes on rough ground. The first cross between a Blackfaced ewe and a Wensleydale ram results in a sheep yielding first-class mutton, and attaining from 18 to 22 lbs. per quarter at from eighteen to twenty months old. The next cross between a half-bred ewe, bred as above, mated with a Wensleydale ram, produces a sheep which will attain 20 lbs. a quarter when a year old, and is a favourite sort with the butcher on account of the high quality of its mutton. The ewes of the Wensleydale breed are prolific. There is usually more than fifty per cent. of twin lambs weaned in a flock, and frequent cases have been known of two lambs having been reared from every ewe in a flock. The hoggs or yearling sheep clip from 10 to 16 lbs. of wool each ; the ewes a little less."

DEVON LONGWOOL.

The "Bampton Nott" is a very ancient variety, which was described in 1798 as "a valuable sort, not much unlike the Leicester, well-made, and covered with a thick fleece of wool, weighing in general 7 lbs. or 8 lbs., and they sometimes reach 12 lbs. The wethers, when two years old and fattened on turnips, attain the weight of about 25 lbs. per quarter." These Bampton Notts were crossed with the Leicester, the Lincoln, and the Cotswold, but chiefly with the first-named, and so, while retaining the good points of the original, a sheep of Leicester type has been evolved. It is chiefly bred in central and eastern Devon, West Somerset, and certain districts of Cornwall. A well-bred Devon Long-wool differs from a pure Leicester, says Mr. Joseph Darby, in having a longer and larger face, with greater width at the

forehead and nose, the ears being also longer. The frame is more bulky and of greater length, although not quite so round or compact, but the girth is equal to that of the Leicester. The Devon Longwool also appears to stand higher than the Leicester, which it surpasses in good constitution and hardiness ; it will attain greater weight of carcase and more flesh in a given time, and is also reputed to come earlier to maturity. The wether sheep are never kept until they are two years old, but come out in the months of March, April, and May, weighing from 22 lbs. to 24 lbs., and in some cases 25 lbs. the quarter ; and when shorn, they cut from 9 lbs. to 11 lbs. of clean washed wool each, although they have been shorn as lambs the preceding year. These results are usually obtained by natural food, with very little, if any, assistance from oil-cake or corn. The ewes clip from 8 lbs. to 9 lbs. each. At the Smithfield Club Shows the average live weights have been : lambs under twelve months, 159 lbs.; wethers twelve to twenty-four months, 244 lbs.

SOUTH DEVON, OR SOUTH HAMS.

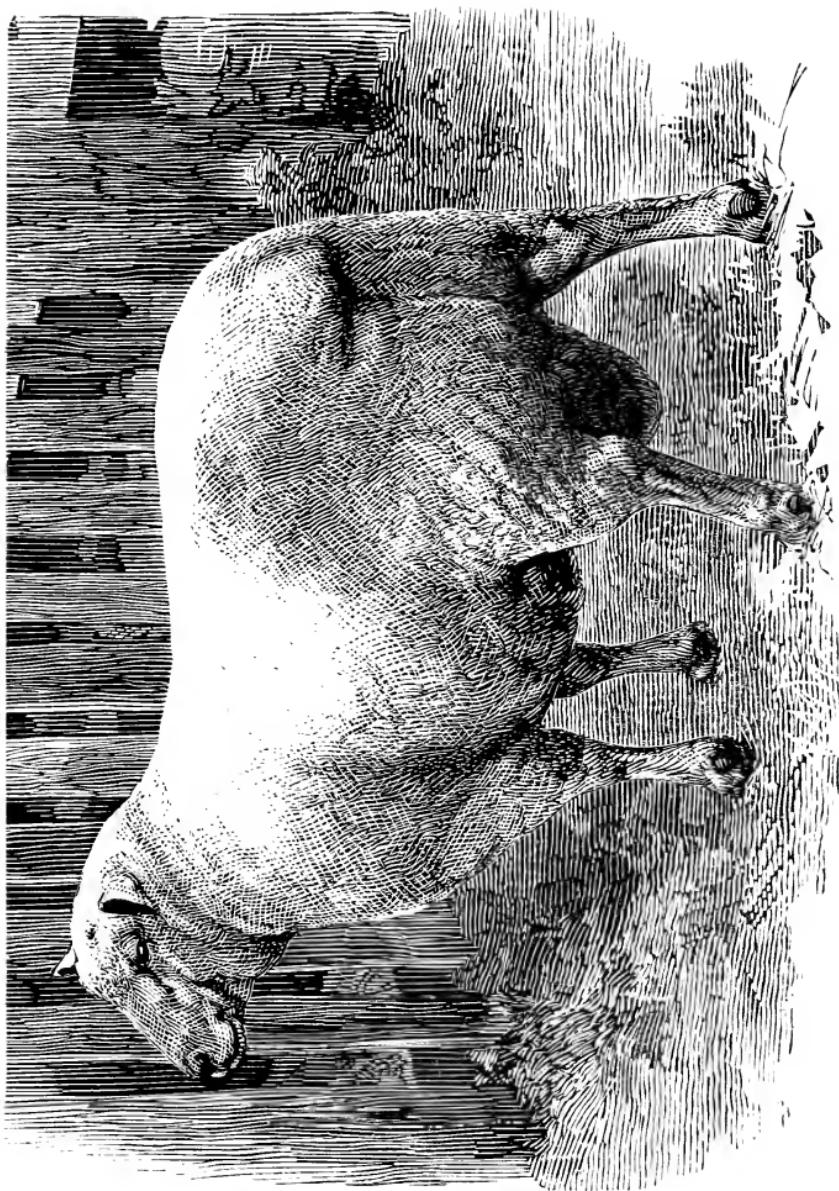
This is a more local variety of Devon sheep, descended from the South Hams Notts, which were crossed with the Leicesters. By this means the flesh was improved in quality, earlier fattening was developed, and the fleece became more valuable. The wool is now moderately fine, and the staple long ; the fleece weighs about 9 lbs.

ROSCOMMON.

The chief sheep-breeding province of Ireland is Connaught, and at the great fair held at Ballinasloe in the month of October each year, there is always a fine collection of the Roscommon breed, a large and useful variety, the type of which has been much improved by the introduction of Leicester blood, and then by careful selection.

Shearling wethers are often sold to the butcher making 25 lbs. to over 30 lbs. per quarter. When disposed of at thirty months old to Leinster graziers, they are kept until they are three years old, and will then weigh 36 lbs. and upwards per quarter. Draft ewes, fed after being cast for breeding, weigh from 34 lbs. to 40 lbs. per quarter. The Roscommon sheep are generally reared entirely upon grass, with the aid of some hay during winter. The quality of the mutton is good. The wool is soft, deep-grown, and rich. The fleece from grass-fed wethers and hoggets weighs about 10 lbs., but 8 lbs. may be taken as the average, though occasionally higher weights are made; a prize ram gave a fleece of 24 lbs., a shearling ram 14 lbs., and ewes shorn while rearing lambs have clipped 14 lbs. and even 16 lbs. of wool.

SOUTHDOWN RAM,



CHAPTER III.

BRITISH BREEDS OF SHEEP — THE MIDDLE-WOOLS OR SHORTWOOLS.

THE Longwool breeds of sheep, which have just been noticed, are characterised, as we have seen, by their heavy fleeces. Several of them have been bred chiefly with a view to the production of high quality and wealth of wool ; others have been cultivated more particularly with the object of combining mutton and wool, though the former occasionally possesses too much fat to suit modern tastes. The Middlewool or Shortwool breeds, which will now engage our attention, have been bred mainly with the aim of developing the finest quality of mutton, and in this purpose breeders have attained remarkable success. In tracing the progress of the Longwool varieties we have seen that the dominant factor in bringing about improvement has been the Leicester. In the case of the Middle or Short-wools we shall discover that the most powerful influence has been

THE SOUTHDOWN.

The mountains, downs, forests, and less fertile districts of Britain were in ancient times inhabited by races of sheep differing greatly from those that formed the foundation of the Leicester breed and its offshoots. There were two leading descriptions of these mountain and down sheep, one having been characterised by small size, white legs and

faces, and by the absence of horns. The legs and faces of the others were of a dark colour, and the sheep were provided with horns. These two parent races branched off into numerous sub-varieties, their features being modified and diversified by the situations in which they were placed and the other external circumstances to which they were exposed. As a rule the fleecy denizens of the mountains and downs were distinguished by the excellence of their mutton, their active habits, necessitated by long journeys in search of the scanty food that was available, conduced to the development of the finest possible quality of meat.

Among these splendid mutton sheep the Southdown—tersely and accurately described on the Leicester monument at Holkham as “small in size but great in value”—occupied, and has for many years maintained, a foremost place. The South Downs of Sussex, from which this favourite breed derives its title, consist of a range of low, chalky hills, five or six miles in breadth, stretching along the coast for a distance of upwards of sixty miles and passing into the chalky hills of Hampshire in the west. Youatt and other authorities thought it probable that the original Southdown breed was horned as the Blackfaced Heath breed now is, because it was not unusual in his day to find among ram lambs specimens with small horns. He further believed that the dusky or somewhat dark hue of the head and legs of the Southdown not only proved what was the original colour of the breed, and perhaps of all sheep, but the late period at which it was seriously attempted to get rid of this dingy tint. Mr. Alfey remarked in Arthur Young's “Annals of Agriculture,” 1794, that he was convinced that were the Southdown breed to be left in a wild state, it would in a very few years become entirely black. He had twelve or fourteen black lambs, although he never kept a black ram or ewe. These statements are interesting as indicative of the original derivation of the breed, but it is now quite exceptional for any of the reverersions mentioned to occur.

As to the antiquity of the Southdown sheep Mr. T. Ellman, son of the first improver of the breed, made some remarks at a meeting of the Royal Agricultural Society of England in 1865. He said its natural character at once showed that it was of a mountain race and was well adapted for the South Downs. It might, he said, fairly be inferred, in the absence of any authentic statement, that it hardly existed in England before the Roman invasion. In fact, little was heard of it before the Norman Conquest, but from a very early time the South Down hills, with their short, fragrant pastureage and dry and healthy situation, must have been the most natural home for these sheep. The first distinct record of the breed states that over two hundred years ago sundry flocks feeding in the Downs were annihilated by a disease called small-pox, which was imported from Holland.

Mr. John Ellman began his experiments as an improver of the breed about 1780, when he acquired possession of the farm of Glynde, near Lewes, in the county of Sussex. He remained on this farm for more than fifty years, and during all that time diligently devoted his attention to increasing the value of the Southdown sheep. His son says that in several points his father's aim differed from that of his distinguished contemporary, Bakewell. It was Bakewell's desire to obtain the maximum of fat mutton with the minimum of bone. As has already been shown, he disregarded wool in comparison with fat. Mr. Ellman, on the other hand, objected to forcing his young stock, and was anxious to maintain strength of constitution; and although at the outset he was driven to a little in-breeding, from the difficulty he experienced in obtaining good animals from other flocks, yet as the work of improvement advanced he acted otherwise. Unlike Bakewell, who operated upon a variety of races of sheep, and who was thus compelled to resort to in-breeding in order to impart fixity of type, Ellman had a homogeneous breed with which to deal. He selected the best individuals of that race, and

retained only these for breeding. The Leicester might thus be designated a breed of artificial creation, while the Southdown was improved by selection conducted within itself. The maintenance of a high standard of excellence was consequently easier, the work of improvement could be continued with less skill, and there was not the same danger of deterioration as in the case of the Leicester. Arthur Young, writing in 1794, remarked that Ellman's flock was unquestionably the first in the country. There was, he added, nothing that could be compared with it—the wool the finest, and the carcase the best proportioned. Mr. Ellman died in 1832, his flock having been sold in 1829. Among noteworthy private transactions were the purchase of two rams by the Duke of Bedford for the Emperor of Russia at 300 guineas, and two for himself at the same rate.

The Southdowns then spread widely over the country. The unsurpassed flavour of their mutton, their wonderful hardiness, their regular breeding qualities, and their early maturing properties caused them to be sought for maintaining in a pure state and for crossing with other varieties. In many counties they have enormously improved the native races, while in others they have supplanted them. As a pure breed they took a firm root in the counties of Norfolk and Cambridge, where indeed some of their greatest triumphs have been gained. Formerly 12 to 14 lbs. per quarter was considered a fair weight for a two-year-old wether, and the finished sheep was often four or five years old, when it weighed perhaps 18 or 20 lbs. per quarter. Now Southdowns are fit for the butcher at thirteen to fifteen months old, and up to the weight formerly attained by old sheep; while the dead weight of two-shear wethers is 20 to 22 lbs. and up to 30 lbs. per quarter; some at Christmas shows appearing with still greater weights—lambs under twelve months averaging 147 lbs. live weight, and wethers twelve to twenty-four months 206 lbs. The fleece averages at least $3\frac{1}{2}$ lbs. in the hill and 4 lbs. to 6 lbs. in

the lowland districts, $4\frac{1}{2}$ lbs. being the general average. The wool is very fine, close, and curled.

In Norfolk and Cambridge the breed was placed among surroundings differing considerably from those that prevailed in the South Downs. Instead of a country with short and scanty herbage, compelling a great deal of exercise in order to procure food, it found itself in one of the richest agricultural districts of England. On these highly-farmed lands the breed attains to larger size, has grander fore-quarters and greater expansion of frame generally, with specially well-formed shoulders, broad loins, full rumps, and heavy legs of mutton. Thus a bigger variety of the Southdown was produced. The Sussex breeders and the Norfolk and Cambridge breeders have had different aims. The former desired to retain the high quality and old features of the race. Those residing in the more fertile localities, while adhering as closely as possible to the old type, successfully endeavoured to rear sheep of larger scale. In short, while the Sussex men were quite content to preserve the breed as one eminently adapted for the Downs, the other breeders assumed an aggressive attitude towards the supporters of the more massive types and breeds that, owing their improvement to the Southdown, threatened to drive it out of the markets. To these efforts to secure a wider area for the breed no one contributed more valuable services than the late Mr. Jonas Webb, of Babraham, who, after experimenting with various breeds, selected the Southdown, and for nearly forty years devoted much attention to its improvement. At the Royal Show at Canterbury in 1860 the Babraham flock gained the whole six prizes offered for rams. The good work begun by Mr. Jonas Webb was continued by his son, Mr. Henry Webb, at Streetly Hall, and the names of many other improvers might be given if space permitted. The Babraham and Streetly strains have been infused into most of the leading Sussex flocks. The breed is now in very able hands, and increases in popularity every year.

The points of the breed are thus given in the South-

down Flock Book : "In a good Southdown we look for a head wide and level between the ears, with no sign of slug or dark poll ; eyes large, bright, and prominent ; ears of medium size, covered with short wool ; face full, not too long from eyes to nose, and of one even mouse colour, not approaching black nor speckled with white ; under-jaw light ; neck wide at base, strong and good ; shoulders well put in, the top level with the back ; chest wide and deep, thick through the heart ; foreflanks fully developed ; ribs wide-sprung and well ribbed up ; back level, with wide and flat loin, the whole covered with firm flesh ; flanks deep and full ; rump wide, long, and well turned ; tail large and set on almost level with chine ; thighs full and well let down, with deep, wide twist, ensuring a good leg of mutton ; legs a mouse colour, and 'outside the body,' the whole of which should be covered with a fine, close, and even fleece down to hocks and knees, and right up to the cheeks, with full fore-top ; but there should be no wool under the eyes or across the bridge of the nose. The skin should be of a delicate and bright pink, the carriage gentlemanly, and the walk that of a thoroughbred."

The breed possesses hardy constitution, adaptability to almost any climate, and the habit of thriving on bare pasture ; it gives a generous return for good feeding, and enjoys comparative immunity from foot-rot ; and from the density of its fleece there is less liability to "fly" than in some other varieties.

SHROPSHIRE.

One of the most popular breeds of sheep in the United Kingdom at the present moment is the Shropshire. It is held in high estimation alike in England, Scotland, and Ireland, and is found to be adapted to the varying climates of all three countries, while in the United States, Canada, on the Continent of Europe, and elsewhere abroad it is almost as much appreciated as it is at home. The rapid

progress of the breed forms one of the most remarkable circumstances connected with live stock history. Neither Low nor Youatt mention it, as it now exists, in their accounts of British sheep. It was not until 1861 that it was permanently placed upon the prize lists of the Royal Agricultural Society's Shows, and it was only in 1848 that it received its distinctive name of "Shropshire." The materials upon which the breed was founded appear to have comprised the native sheep of Shropshire and Staffordshire, such as the old Shropshire, the Morfe Common, the Longmynd, the Clun Forest, and the Cannock Heath. Some authorities, however, consider that the chief element was the Morfe Common, which, in 1792, the British Wool Society reported as being "a black-faced, or brown, or spotted-faced horned kind, little subject to rot or scab, weighing, the wethers from 11 to 14 lbs., and the ewes from 9 to 11 lbs. per quarter, after being fed with clover and turnips, and clipping nearly 2 lbs. per fleece, exclusive of the breaching, which might be taken at one-seventh or one-eighth part of the wool. The fine wool sold at 2s. per lb., and the breaching at 1s. per lb., making the produce of the fleece about 3s. 2d." Youatt remarks that it was probably the Morfe Common species of Shropshire wool that in 1343 was the choicest and the dearest in England, and in 1694 it was stated that "Shropshire wool was not to be equalled in its kind by any part of the world, and was suitable to almost any degree of quality."

It was upon this valuable type, then, that the improvements began to be made by the judicious infusion of Southdown, Leicester, and Cotswold blood—especially the first-named—and it has been contended that there was also a Merino cross. The horns were bred out, a larger frame was produced, and splendid quality of mutton was developed. The Shropshire is indeed compounded of the best materials that could be found, and is truly an epitome of all that is excellent in British sheep as regards mutton, wool, constitution, prolificacy, and early maturity. For

many years no fresh blood has been introduced, the later attempts to infuse more of the Southdown and Leicester strains having signally failed. What breeders have accomplished during the last fifty years has been the fixing of type, so that the breed is now uniform and true in character.

The breed, in its improved form, may be thus described : A well-developed head, with clear and striking expression of countenance, a muscular neck, well set on, good shoulders, the body symmetrical and deep, placed as squarely as possible on short legs, due regard being paid to grandeur of style, a well-covered head, and wool of the best staple and most valuable kind, rejecting as much as possible all animals showing an inclination to produce black wool or dark skins ; the skin should be a nice cherry colour, and the face and legs a soft black, not sooty nor a rusty brown, and free from all white specks. The belly should be well woolled, and a tendency for wool to peel at the jaw and legs should, says Mr. Alfred Mansell, be avoided. Shropshires are not only very prolific, but they are capital nurses. The quality of the flesh is excellent, carrying a large proportion of lean meat to fat. They are light in offal, and with good farming come to market at eleven to fourteen months old weighing 20 to 25 lbs. per quarter ; in some instances attaining greater weights. Wethers at eighteen to twenty months old, at the Fat Stock Shows, frequently make 50 lbs. per quarter, and ewes have been exhibited of over 46 lbs. per quarter. The average clip for a fair Shropshire flock—fleece and teg wool—is 7 lbs., but many flocks average quite $7\frac{1}{2}$ lbs., and the wool commands top price. Individual fleeces often reach 14 lbs., which is maintained for the second and third years. At the Smithfield Club Shows the live weights have been on the average, for lambs under twelve months, 153 lbs. ; wethers, twelve to twenty-four months, 241 lbs.

OXFORD DOWN.

This is one of the most recent examples of the success of English breeders in creating a race of sheep that has by its intrinsic merits, in a very brief period, attained to a high position in public favour. The breeders who were most closely associated with its formation were Mr. Druce, of Eynsham; Mr. Gillett, of Southleigh; Mr. Blake, of Stanton Harcourt; and Mr. Twynham, Whitchurch Farm, Hampshire. They made no concealment of the methods by which they developed the breed, Mr. Twynham crossing his Hampshire Down ewes with a Cotswold ram, and subsequently infusing the cross into his flock. Mr. Druce says the foundation of this class of sheep at his place was begun about the year 1833 by using a well-made and neat Cotswold ram with Hampshire Down ewes. Others used the Cotswold ram on Southdown ewes. The great point to which breeders directed their attention, after they had obtained, by crossing, a variety of special merit, was to secure uniformity in type and character, and this they have done by close breeding. The breed now possesses, along with uniformity of character and hardiness of constitution, a large frame, aptitude to fatten, mutton of superior quality, and a heavy fleece of thickly-set wool. The ewes are good mothers, and drop a large proportion of twins. The following description of an Oxford Down ram is taken from the Oxford Down Flock Book: He has a bold, masculine head, well set on a strong neck; the poll is well covered with wool and adorned by a top-knot; the ears are self-coloured and of good length; the face is a uniform dark-brown colour; the legs are short, dark-coloured (not spotted), and placed well outside him; the barrel is deep, thick, and long, with straight underline; the chest wide; the back level; ribs well sprung; tail broad and well set on; the mutton is firm, lean, and of excellent quality; the fleece is heavy and thick on the skin.

At twelve to thirteen months old, when the hogs or tegs are sold fat, they weigh 20 to 24 lbs. per quarter dead weight, exhibition pens weighing nearly as much as Lincolns or Cotswolds. Thus, at the Smithfield Club Shows, lambs under twelve months give an average of 19.4 lbs. live weight, and wethers between twelve and twenty-four months 24.8 lbs. The average weight of fleece for a whole flock is about 7 lbs., but shearling rams have clipped up to 20 lbs. per fleece. Mr. John Treadwell, a famous breeder, says that if they are well kept Oxfords are fit to sell at any time from ten to twelve weeks up to twenty-two to twenty-three months old, and they keep on gaining in flesh from a fat lamb at 40 or 50 lbs. dead (dressed) weight up to a Christmas wether of 200 to 240 lbs. dead weight. Mr. Treadwell has had ewes as heavy as 256 lbs. dead weight, and once he had a ram of 337 lbs. dead weight.

HAMPSHIRE DOWN.

This breed was established by the crossing of the old Wiltshire horned sheep and the old Berkshire Knot with Southdowns, which were introduced into Wiltshire and Hampshire early in the present century. The process of improvement had been going on for a long time, but there was a want of quality and uniformity. While the breed was in this transition state, the late Mr. William Humphrey, Oak Ash, near Wantage, Berks, appeared on the scene. Writing in 1858, Mr. Humphrey explained, that in forming his flock, about twenty-five years before (*i.e.* about 1833), he purchased the best Hampshire Down ewes he could procure, using the best rams he could find; but the result did not satisfy him, and he determined to introduce Southdown blood, selecting for the purpose some of the largest and best fleshed of Mr. Jonas Webb's rams. In the subsequent management of the flock great ability was displayed, and no fresh blood was introduced for twenty years. Mr. Humphrey said his aim had been to produce a Down

sheep of large size, with good quality of flesh, and possessing sufficient strength and hardiness to retain its condition when exposed in rough and bad weather to consume the root crops on the cold hills.

The work so well begun by Mr. Humphrey has been systematically continued by the breeders of this variety, who have been remarkably successful in achieving their object. It is now generally allowed that no breed of sheep attains to such early maturity as the Hampshire Down lambs in the months of March and April, as they then have a dead weight of from 12 to 14 lbs. per quarter; and by the month of October (at the age of nine months) they weigh as much as 80 to 100 lbs. of mutton, whilst the ram lambs, which are sold for service during the months of July and August (at which age the sires of this breed are generally worked), often reach a dead weight of 120 lbs. The sheep possess hardiness of constitution and adaptability to different soils and climates. They have especially distinguished themselves at the Fat Stock Shows.

The chief points of a true Hampshire Down sheep have been thus given in the Flock Book of the breed: A long, deep, and symmetrical carcase, with the ribs well sprung, broad straight back, flat loins, full dock, wide rump, deep and heavily developed legs of mutton and breast, head and neck well placed on, gradually sloping and closely fitting shoulders, the neck being particularly of a strong, muscular growth, and not too long; the ears nicely set on, of fair length and whole-coloured; prominent intelligent eye; the body as above described, standing on strongly-jointed and powerful legs, with good feet, presenting a smart and attractive appearance. The colour of the face, cheeks, ears, and legs should be of a rich dark brown, approaching to black, white specks or black bar between the ears being specially avoided. The wool is moderate in length, of close and fine texture, reaching well over the forehead, the skin being of a delicate tint; the average weight of the fleece is $4\frac{1}{2}$ lbs. to 5 lbs.

At the Smithfield Club Shows lambs under twelve months old average 194 lbs. live weight, and wethers twelve to twenty-four months old, 248 lbs.

SUFFOLK.

This breed has recently made great advances in public favour on account of its practical usefulness. It was based upon the original Norfolk horned breed, the ewes of which were crossed with Southdown rams. Arthur Young, writing in 1797, spoke of these Norfolk horned sheep as furnishing mutton than which, as regards "texture or grain, flavour, quantity and colour of gravy, with fat enough, there was no superior for the table of the curious." The wool, too, was fine, and the sheep were remarkable for their hardiness, their ability to bear hard driving, and for their success as nurses. The best flocks were near Bury St. Edmunds, so that Young naturally thought they would more accurately have been described as the Suffolk rather than as the Norfolk breed. As the result of the cross with the Southdown the form and fattening properties were improved; the black face and legs of the Norfolks were retained, but the horns were got rid of. The breed as it now exists is black-faced and hornless, with clean black legs, closely resembling Southdowns in character and wool, but being larger and proportionately longer in the leg. In an essay by Mr. E. Prentice in the Suffolk Flock Book it is claimed that they excel in the following points. Fecundity: thirty lambs reared per score ewes is a frequent average. Early maturity: if well grazed they are fit for the butcher at ten to twelve months old, and the lambs are so forward at seven to eight months that nineteen breeders out of twenty prefer them as tupps to older sheep. Hardihood: they will get a living and thrive where other breeds would starve. Mutton: the quality is super-excellent, with an exceptionally large proportion of lean meat, and commands a ready sale at top prices. Constitution: their robust, hardy character,

power of endurance, and comparative freedom from attacks of foot-rot during the past fifteen years caused them to displace, to a great extent, the half-bred sheep formerly in favour in marshland districts. We copy from the Flock Book the annexed scale of points as descriptive of a typical specimen of the breed : Head hornless ; face black and long, and muzzle moderately fine, especially in ewes ; a small quantity of clean white wool on the forehead is not objected to ; ears a medium length, black and of fine texture ; eyes bright and full. Neck moderate length and well set (in rams stronger, with a good crest) ; shoulder broad and oblique ; chest deep and wide. Back and loin long, level, and well covered with meat and muscle ; tail broad and well set up ; the ribs long and well sprung, with a full flank. Legs and feet straight and black, with fine and flat bone ; woolled to knees and hocks, clean below ; fore-legs set well apart ; hind-legs well filled with mutton. Belly (also scro'um of rams) well covered with wool ; fleece moderately short, close, fine fibre, without tendency to mat or felt together, and well defined—*i.e.* not shading off into dark wool or hair. Skin fine, soft, and pink colour.

At the Smithfield Club Shows Suffolk wethers twelve to twenty-four months old average 271 lbs. live weight ; ewes over three years 275 lbs., and lambs under twelve months 187 lbs. The fleece averages about 6 lbs.

DORSET HORN.

The Dorset or Somerset Horn is one of the oldest breeds in the country, and has possessed several of the more important features for which it is now celebrated for nearly two hundred years, a writer in 1757 having stated in reference to these sheep that “one of his tenants had ewes which brought him lambs at Christmas ; these he sold fat to the butcher at Lady Day, 1707, and at the beginning of June, thinking his ewes to be mutton, they looked so big, he went

to sell them to the butcher, who handled them and found their udders springing with milk and near lambing, and accordingly they did lamb the first week in June." The valuable characteristics of the breed are its fecundity, the excellence of the ewes as nurses, and especially the fact that they take the ram at any desired period, so that they are noted for the production of early lambs, which are, of course, always in demand for the London market. Occasionally two crops of lambs are taken from ewes in one year, but in this case special precautions have to be observed to guard against weakening the ewes. Towards the close of the last century it would appear that this useful race was nearly annihilated by crossing with the Hants, Wilts, and other breeds ; and later the Southdown and Merino were introduced to its districts. Gradually, however, the Dorset Horn reasserted its supremacy, drove out its competitors, and is now the predominant breed of the counties of Dorset and Somerset. The breed has been greatly improved, while retaining its specially valuable points. The original sheep were much smaller than the present breed, which is straight and deep in the body, with well-arched ribs, broad loin, and well-set-on neck. Mr. J. T. Ensor, in a paper written for the Dorset Horn Flock Book, says : "They are full in the shoulders, without coarseness, and the hind limb is well let down towards the shank, forming a good leg of mutton, with small bone. The general features are pleasing ; the head standing well up, the horns thin, with a symmetrical curl, the eye quick and lively, the face rather long and thin, and the lips and nose pink or flesh-coloured. They are excellent nurses, good folding sheep, and the mutton is well-flavoured and has a good proportion of lean." The wool is of very good quality. The wethers come out fat at thirteen to fourteen months old, the carcase weighing from 70 to 80 lbs. each. The lambs go to the butcher at ten to twelve weeks old, when they average 10 lbs. to 14 lbs. per quarter, and realise high

prices. The ewes clip 5 lbs. to 6 lbs. of wool, rams 10 to 12 lbs., and the lambs, which are usually shorn, about half as much as the ewes. At the Smithfield Club Shows the live weight of wethers twelve to twenty-four months old averages 270 lbs., ewes over three years old 291 lbs., and lambs under twelve months 193 lbs.

RYELAND.

Although this breed is now in very few hands, it at one time occupied a very prominent and important position, being unsurpassed for the quality of its wool. Professor Low remarks that the wool of the Ryeland breed was long regarded as the finest that the British Islands produced. The ancient city of Leominster, he remarks, being surrounded by a country producing this kind of wool, and being the market to which it was brought for sale, gave its name to the wool of the county, which was termed "Lemster wool" or "Lemster ore." Drayton, who wrote in the reign of Henry VIII., when comparing the wool of the Cotswold Hills with the lighter fleeces of Lemster, bears testimony to the superior fineness of the latter. The genuine Ryeland was a small polled sheep with white face, the wool growing close around the eyes. The legs were small, the bone light, and the carcase round and compact. The fleece averaged $1\frac{1}{2}$ lbs. to $2\frac{1}{2}$ lbs., and the weight of the wethers per quarter was from 14 to 16 lbs. This breed was extremely hardy, patient of hunger, and capable of thriving on very scanty fare. The breed was crossed with Southdowns and also with Merinos, but without advantage. Latterly Herefordshire has been invaded by the Shropshires, and it was at one time thought that the Ryeland had become extinct. This was a mistake, however, as there are still some thirty flocks in existence. In its present form the breed is compact and hardy, and fattens readily, when liberally fed, up to 20 lbs. per quarter at twelve to fourteen months old. Pure-bred

lambs, and also crosses by a Ryeland ram on ewes of other breeds, are liked by the butchers. The sheep have white faces, are polled, and have a tuft of wool on the forehead. The fleece, where the sheep are well kept, weighs 7 to 8 lbs. on an average. The comparative immunity from foot-rot which these sheep enjoy is also in their favour.

CHAPTER IV.

BRITISH BREEDS OF SHEEP—THE MOUNTAIN AND FOREST BREEDS.

WHILE many of the Longwool and Shortwool breeds possess a certain amount of similarity of type, due to the infusion of Leicester and Southdown blood which has been incorporated with the local varieties to their great advantage, the Mountain and Forest sheep as a rule show well-defined variations of character. This is not because attempts have not been made to improve them by crossing, but because these hardy races have for many years been bred with a view to their adaptation to the exacting conditions of their surroundings, so that the amalgamation of finer breeds has been effected only with loss of constitutional vigour. The result is that where it has been attempted it has, after a short time, generally been abandoned, unless in districts that, though elevated, yet possess a comparatively genial climate. The strong and robust mountain sheep are of very great value, inasmuch as they enable vast tracts of high-lying ground to be profitably utilised. The breeders who have done their utmost to preserve and to improve these mountain varieties of sheep have rendered a service of no less importance than those who have developed and ameliorated the finer breeds of the lowlands and downs.

SCOTCH BLACKFACED MOUNTAIN.

This grand-looking breed is cultivated very extensively in Scotland, where it occupies a position of great importance. Walker, in his "Hebrides," quoted in the "General View of the Agriculture of Scotland," 1814, states that it is uncertain whence the Blackfaced breed was originally derived, but there was a tradition of its having been first planted upon the farm of King James IV. in the forest of Ettrick in 1503. We are, however, more inclined to favour the theory that the breed resulted from improvement of the ancient "dun faces," which were at one time the most prevalent sheep in Scotland. The following is a description of a perfectly made ram of the breed, as given by Mr. James Moffat, Jun., in a paper written for the Glasgow and West of Scotland Agricultural Discussion Society. He commences by referring to the animal as "majestic, symmetrical, commanding, and picturesque," with lofty carriage and appearance, and then says: He has a broad, slightly arched, deep face, with a square muzzle, wide nostrils, a wild, piercing eye, and a small tuft of fine wool on the forehead, called a snowlock. The prevailing colour of his face is jet black, any white marking being very distinct. The division between the jaws, where it joins the neck, is extremely wide. His horns go flat away from the crown, with a space of skin and hair between the roots, tending slightly backwards and outward with a wide, graceful spiral turn, wide enough that when they grow round they will clear his cheeks; they are long, and of medium thickness. The formation of the head is a pretty sure indication of the form of the body. His neck is of medium length, joining strongly at the jaws, carrying its thickness back and attached firmly on to broad and massive shoulders. His ribs behind the shoulder-blades being well arched and deep, the breast-bone comes well through between the fore-legs, giving a large space for the vital organs, and making him have a round, barrel

appearance. His lumbar vertebræ must be short from the last ribs to the loin bones, very broad and flat, quarters long and level, with well-rounded, fleshy, wide gigots, set squarely on strong, sinewy legs. His legs, which are the same colour as the face, ought to be very powerful above the knees and hocks, standing well back on the pasterns, with large, wide feet. The hind-legs have a covering on the outside of fine wool, of the same character as that on the forehead. A ram with this feature will always be well covered underneath, and have a good strong fleece. One with a clean, bare face and legs is very liable to have a weak coat with bare patches underneath, as well as above the knees and hocks. He should be covered with a very heavy fleece of long, thick wool of from 15 inches to 20 inches in length, of uniform strength over the whole body, and free from black spots or hairs. The chief points of the ewes are the same as those of the ram, but they are of quite a feminine and refined character. These sheep are muscular, of a hardy constitution, and well adapted to endure the privations and severe climate of the hilly districts in which they are kept. They have also the important property of being able to find a subsistence upon heather, with which the Highlands generally abound, and which affords them food even when the surface of the ground is covered with snow. Though a pure mountain breed their habits are not so restless as might be expected, and they are more docile than one would suppose. The ewes, when fat, will weigh from 15 to 18 lbs. per quarter, and the wethers from 16 to 20 lbs. per quarter. Sheep nineteen months old have been made up for the Christmas shows to weigh 215 lbs. live weight, and show sheep make as high as 120 lbs. of mutton. The wool is long, and coarse in quality. The average clip of a flock is $4\frac{1}{2}$ to 5 lbs. per head. Tup hogs will clip up to 8 lbs. or 10 lbs. A show ram clipped 16 $\frac{1}{2}$ lbs. of wool. The Blackfaced sheep crosses well with Cheviot, Leicester, and Down. The quality of the mutton of the pure breed

is exceedingly fine, especially that of three-year-old wethers or young and tender lambs. In recent years the breed has been much improved both in the symmetry of its form and in early maturity, young sheep now coming out fat at from nine to eighteen months old.

CHEVIOT.

This breed derives its name from the range of hills on the English and Scotch borders, and is to be found chiefly in the counties of Northumberland, Roxburghshire, Peeblesshire, and Dumfriesshire, where it occupies a position of much importance. The breed is also cultivated in the counties of Sutherland and Caithness. The first improvement was made about 1760, when, as Mr. Aiton states in his General View (1814), the Cheviots were crossed with tups brought from Lincolnshire; and there were later instances of an infusion, during the early part of the present century, of the blood of the Dishley or Leicester. In the inspection conducted by Sir John Sinclair for the British Wool Society in 1791, he gave a favourable report on the wool of the breed. The annexed description of a Cheviot ram is taken from the first volume of the Cheviot Flock Book: A Cheviot tup when arrived at maturity weighs, when fat, at least 200 lbs. live weight. He should have a lively carriage, bright eyes, and plenty of action. His head should be of medium length, broad between the eyes, well covered with short, fine white hair; his ears, nicely rounded and not too long, should rise erect from the head—low-set or dropping ones are a decided fault, but at the same time they should not be what are called “hare lugged”—that is, too near each other, as that indicates a narrow face, which generally denotes a narrow body. His nose and nostrils must be black, full, and wide open; his neck strong, and not too long; his breast broad and open, with the legs set well apart. His ribs must be well sprung and carried well

back towards the hook bones, as a long, weak back is about the worst fault a Cheviot can have. His back must be broad, and well covered with mutton ; his hind-quarters full, straight, and square ; the tail well hung, and nicely fringed with wool. His legs must stand squarely from the body (bent hocks either out or in, the latter especially, are looked upon as a weakness) ; the bone must be broad and flat, and all must be covered with short, hard, white hair. He ought to grow a fleece weighing 10 or 12 lbs. of fairly fine wool, densely grown and of equal quality. Coarseness on the top of the hooks is a decided blemish ; the wool should meet the hair at the ears and cheeks in a decided ruffle ; bareness there or at the throat is inadmissible, and it should grow nicely down to the hocks and knees. The belly and breast should be well covered. The same description, when modified, will also apply to ewes, which will weigh 100 lbs. to 150 lbs. Cheviots, when in a natural state, must grow finer wool, as hard feeding inclines to make it stronger, but it must be stiff and dense, and not too short. A hill flock should clip on the average $4\frac{1}{2}$ lbs. each. If wethers are kept that average will be increased. A lot of draft ewes when fed moderately fat will weigh from 95 to 100 lbs., and old wethers 160 lbs. live weight. It must always be remembered that along with feeding qualities Cheviots must embody great hardihood and milking properties, for they are expected to stand privations in their native hills in hard winters and backward springs ; for if once they are bred too soft to live and bring lambs on their own ground, they either die off and the cast cannot be kept up, or their owners have to incur great expense in taking grass parks or other keep, which, with wool at its present price, is a ruinous business. The perfect Cheviot is one which will live and thrive well on the hardest keep, and when taken to lower and better ground prove itself equal to the occasion by growing larger and becoming fat. The ewes are prolific and are good nurses. The fleece, of soft wool of medium length, weighs

on an average about $4\frac{1}{2}$ lbs. Ewes when fat generally weigh from 14 to 18 lbs. per quarter dead weight; wethers 18 to 20 lbs. per quarter at three years old. The mutton is of good quality, and the sheep cross well with other breeds.

HERDWICK.

This breed is chiefly maintained on the mountains of Cumberland and Westmoreland, and there are also a few flocks in Wales. It has been stated that about the time of the Spanish Armada, "forty small sheep managed to save themselves from the wreck of a Spanish vessel stranded on the sandy coast of Drigg, and were claimed as jetsam and flotsam by the then lord of the manor," and it has been alleged that from these the present breed is descended. Mr. J. C. Bowstead gives the following description of the points of the Herdwick: A heavy fleece of fairly strong wool, disposed to be hairy on the top of the shoulder, growing well down to the knees and hocks, pole and belly well covered; a broad, bushy tail, and a well defined toppin, head broad, nose arched or Roman, nostrils and mouth wide, teeth broad and short, jaws deep, eye prominent and lively, and in the ram defiant, ears white, fine, and erect, always moving. The body cylindrical, placed well inside the legs, not on the top of them — *i.e.* the body should be near the ground, back not too long, to be ribbed up nearly to the hook. Chest broad and deep; shoulders sloping; neck strong and carried well up, arms and thighs thick and muscular, knees large, fore-legs strong, but with fetlock well defined, feet large, hind-legs thick and well covered with bristles pointing upwards. As regards colour or markings of the face and legs, there should be no spots or speckles nor any brown, as these are considered sure tokens of a cross. When the lambs are born their legs and heads should be perfectly black, with the exception of a little white on the tips of the ears and perhaps a few white hairs round the feet; these white

hairs gradually increase, so that at six months old one-third or half the ear will be "hoar-frosted"; and there will be distinct bands of the same round the feet shading off to the black of the leg, and by this time also about an inch of the muzzle will have become frosted too. This change of colour goes on until some at the age of three years are perfectly white, others remain a kind of steel-grey. Horns in the ram are desirable but not essential, and they undoubtedly add much to his appearance, but otherwise they are not much valued. When present they should rise out well at the back of the head, be smooth and well curled. White hoofs are much preferred. The wethers at three and four years old, and also the fat ewes, may weigh from 12 to 18 lbs. per quarter, and the mutton is of fine quality, while the small joints and lean character of the meat are recommendations.

WELSH MOUNTAIN.

The breed of sheep kept in the higher mountains of Wales are very much the same as they have been from time immemorial, attempts at crossing with improved varieties having failed. In the lowlands, however, including the finer pastures, the type of sheep has been altered, the size having increased and the quality of early maturity having been imparted by the introduction of fresh blood. The characteristics of the mountain sheep have been thus described by Mr. Morgan Evans: They are principally white-faced, but some have rusty brown faces, some speckled and others grey. The males are horned and the ewes usually hornless, though they sometimes have very short horns and are occasionally found with horns equal in size to those of the rams. The poll is generally clean, but sometimes a tuft is found on the forehead of the ram. The head is small and carried well up; the neck is long and the poll high. The shoulders are low, the chest is narrow, the girth small, and the ribs are flat. The

rump is high, and the tail long. The average weight of the ewes is about 7 lbs. per quarter; the wethers weigh, at three years old, 9 lbs. to 10 lbs. per quarter dead weight. The mutton is famous for its delicacy, and is held in high esteem in the London markets, taking rank with Scotch Blackfaced and Southdown. The average clip of wool is about 5 lbs. per fleece; the quality as a rule is fine, but in some districts it is coarse and mixed with long hairs about the neck and back. The ewes generally produce only a single lamb, but are excellent nurses. Crosses of Welsh sheep with Leicesters or Downs are found valuable in the lowlands, and many Welsh sheep are sent to English counties to breed fat lambs.

In the county of Radnor, on the hills of Brecon, and in the western part of Montgomery and parts of Merioneth, there is a breed of the native dark-faced sheep of Wales—a hardy, active race, developed by good management and selection into animals of larger size than the ordinary mountain sheep, and carrying heavier fleeces. They have been improved by the introduction of Shropshire and of Leicester blood. They have black faces, but many are of a tan, grimy, or grey colour, and some, of questionable purity of strain, have faces partly white. The rams are horned, and the ewes should be hornless. They are short-legged, light in fore-quarter, and, though slow feeders, yield mutton of excellent flavour. At three or four years old the wethers make 14 lbs or 15 lbs. per quarter dead weight; the wool, of fine quality, weighs 4 lbs. or 5 lbs. per fleece. The ewes are prolific and very good nurses.

CLUN FOREST.

This breed is cultivated in the Clun district of Shropshire, the south of Radnorshire, and the adjoining portions of Montgomery. It is of mixed origin, the Ryeland, Shropshire, and Welsh breeds having been used with the native tan-face sheep to produce it, and there is no fixed

idea as to the true type. Some breeders advocate a black face, others a mottled face, while many prefer the tan or fawn-coloured face, with an occasional white spot. The mutton and wool are of excellent quality, while the sheep have hardy constitutions. The ewes are good nurses, and when crossed with a Shropshire ram they produce Easter fat lamb which will weigh, if kept till early summer, 17 lbs. to 18 lbs. per quarter. Ewes and two-year-old wethers weigh about 28 lbs. per quarter. In the best flocks the fleece weighs 6 to 9 lbs. for ewes, and from 10 to 11 lbs. for rams.

EXMOOR.

This breed is native to the lofty hill region of West Somerset, and it is conjectured that they are of the same race as the old Mendip sheep, which were once prevalent over the higher hill ranges of the south-western portion of the island. They have white faces and legs, taper horns curving downward and outward; close-set, long-stapled fleeces, with wool well up to their cheeks; peculiarly rounded instead of square-formed carcase; broad loins, though with slack girth behind the shoulder, and high necks; they are celebrated for their fine-flavoured mutton, and for their hardy constitution, which enables them to endure great cold and privations during protracted falls of snow. The ewes are prolific and excellent nurses, but the breed feed slowly. The common sorts, fat at three or four years old, weigh 12 to 15 lbs. per quarter; and the fleece weighs 5 to 6 lbs. In the more carefully bred flocks, eighteen-months-old wethers weigh 20 lbs. per quarter, while older sheep make 28 lbs. per quarter. The wool in the well-bred sheep also shows considerable improvement.

DARTMOOR.

The Dartmoor, probably of the same original stock as the Exmoor, has been more crossed, particularly with the

South Devon sheep, and has attained to greater size. The breed should have good bone, curly coat, rich skin, thick ear, good top-knot, and speckled face. The ewes are excellent mothers, and the lambs fatten rapidly. Like the Exmoors they have hardy constitutions, and are well adapted for the exposed situations which they occupy. They carry a good fleece of wool.

LONK.

This mountain breed is of large size, and if less hardy than the Black-faces, they are yet well adapted for the fells of Lancashire and Yorkshire, and parts of Derbyshire, where they have for long been cultivated. The face and legs are streaked with black and white ; the yellow horns are strong and curled, but finer than those of the Black-face. They have long carcases, with somewhat light fore-quarter and narrow loin. The wool is much superior to that of the Black-face, and weighs on an average $4\frac{1}{2}$ lbs. to 5 lbs., but better-fed animals clip 7 lbs. to 8 lbs., and even up to 11 lbs. is recorded for selected specimens. Three-year-old wethers make 18 lbs. per quarter dead weight, but show sheep will attain to double that weight. The mutton is close-grained and well mixed.

LIMESTONE.

The home of this breed is in the lower districts of Westmoreland and in some of the Derbyshire hills. The males and females are horned, and the faces, legs, and wool are white. The wool is very long. The sheep are hardy and active. Shearling wethers on ordinary pasture will weigh 18 lbs. to 21 lbs. per quarter, at nineteen to twenty-one months old, and highly-fed ewes make up to 28 lbs. per quarter. The quality of the mutton is choice. The ewes come in season at any time, and can thus be used for breeding Christmas fat lamb.

PENISTONE.

This breed derives its name from a market town between Sheffield and Huddersfield, and it is to be found on the borders of Yorkshire, Lancashire, and Derbyshire, on a heathy tract of land about twenty-six miles in length by twenty in breadth. The wool is of medium length and of a silky appearance, but rather harsh and wiry; the fleece weighs from 4 lbs. to 5 lbs. The wethers average in weight 15 lbs. to 16 lbs. per quarter. The faces and legs are white, and the rams have horns, which lie close to the head and project forward.

SHETLAND.

A hardy and active little breed of sheep is found in the island from which it takes its name. The wool is fine and soft, and the mutton is of good quality. These sheep have backward-curving horns; fleece of a black, brown, grey, or white colour, and considerably mixed with hair. The fleece becomes detached from the skin at the commencement of the summer, and the wool is pulled off by hand. The weight of the fleece is not often above 2 lbs., and the wool is much valued for the fabrication of hosiery goods. When fattened the sheep make about 10 lbs. a quarter as an extreme weight.

CHAPTER V.

THE MERINO.

THIS book does not profess to deal with the sheep of the world, and having described all the known British breeds, we might now proceed to discuss the subjects of breeding, rearing, and management, for the Merino is kept only by a few breeders in these islands. But this remarkable breed has played such a prominent part in foreign countries and in our own colonies, in connection with the development of the sheep industry, that it is necessary to make a brief allusion to the most wonderful of all the varieties of the domesticated ovine races. Nor can the history of the Merino be disregarded by the British breeder, inasmuch as it has exercised an enormous indirect influence upon his position. By the aid of this breed the flockmasters of new countries have been enabled to flood the European manufacturing centres with wool, so that the price of this article has been much depreciated. On the other hand, as time goes on it is found that, unless some return can also be made from the carcase, the keeping of sheep will not pay. The Merino is a bad mutton sheep, and to improve its character in that respect recourse is had to our long-woollen breeds, and the foreign trade for rams is in a large measure owing to the poor character of the Merino as a mutton producer. As to the origin of the Merino hardly anything is known.

But the wool of Spain has from the earliest times been greatly celebrated. During the Middle Ages and the Saracen occupation of Spain, the woollen manufactures of that country were renowned throughout all Europe. After the expulsion of the Moors from Spain its manufactures fell into a state of decay ; and the introduction of the Merino sheep into Saxony, France, Australia, and America, has deprived Spain of the monopoly which she once held.

Two varieties of sheep appear to have prevailed in Spain, corresponding to our Longwools and Shortwools ; but it is with the Merinos alone that we propose to deal. These were called Stationary and Migratory. The Stationary Merinos are chiefly found in the pastures scattered amongst the Guadarrama mountains, the Somo Sierra ranges, and the whole country of Segovia, and hence they are sometimes called Segovia Merinos. They produce beautiful wool, but they have not the same reputation as the Migratory Merinos, which, says Dr. Bowman, in his valuable book on "The Structure of the Wool Fibre," are the most celebrated sheep in the world, and excel all others in the fineness of the quality of the wool. We follow Dr. Bowman's account of these sheep. They are, he says, small in size, with flat sides, narrow chests, and long legs. The first impression made by their appearance is not, as a rule, favourable ; the wool lying closer and thicker over the body than in most other breeds of sheep ; and, being abundant in yolk, which is an oily fatty secretion mixed with the wool, is covered with a dirty crust, often full of cracks. The legs are long, yet small in bone ; the breast and back are narrow ; the fine shoulders and bosoms are heavy ; and too much of their weight is carried on the coarser parts. The horns of the male are comparatively large, curved, and with more or less of a spiral form. The head is large, but the forehead rather low. A few of the females are horned, but as a rule they are not. Both male and female have a peculiar coarse and unsightly growth of hair on the forehead and cheeks, which is cut away before

shearing time. The other part of the face has a pleasing and characteristic velvety appearance. Under the throat there is a singular looseness of skin, which gives a remarkable appearance of throatiness or hollowness in the neck. The fleece when pressed upon is hard and unyielding. This arises from the thickness of the yolk, which retains all the dirt and gravel which fall upon it. The wool, however, when examined, exceeds in fineness and in the number of curves and serratures which it presents, that of any other sheep in the world. The average weight of the fleece in Spain is 8 lbs. from the ram, and 5 lbs. from the ewe. The staple varies in length in different provinces. The wool is usually white, but darker on the legs, faces, and ears. These migratory sheep are divided into two classes, the Leonese and the Sorians. The former are the more valuable. For a long time the laws of Spain were very strict in regard to the exportation of these sheep, so as to prevent their introduction into foreign countries, and indeed at one time they were prohibitive, the penalty being death in case of discovery. About 1723, however, they were introduced into Sweden, but they have not flourished well in that country, probably on account of the coldness of the climate, which is not in favour of the growth of fine wool. Shortly afterwards they were introduced into France. Subsequently in 1786 some three hundred were added. These became the objects of Royal care, and through a system of care and breeding assumed a change of type, and became the source of the French Merino. The Elector of Saxony introduced Merinos from Spain in 1765, and in 1775 they were also taken into Austria, in both of which countries they have flourished in a remarkable manner, so much so that the German Merinos now more than rival the Spanish in the quality of the wool. The two classes of sheep which were introduced into Saxony and Austria are still perfectly distinct. The Saxon breed is called the Escurial. These sheep have longer legs than the Austrian, with a long,

spare neck and head, having very little wool upon it; but the wool is shorter, finer, and softer in the fleece, which weighs from $1\frac{1}{2}$ to 2 lbs. in the ewes, and 2 to 3 lbs. in the wethers and rams. The Austrian Merinos are called Infantado or Negretti, and have shorter legs than the Saxon, with a comparatively short head and neck, and short turned-up nose. The wool grows upon the head as far as the eyes, and down to the feet upon the legs. The wool is very thick in the fleece, and often very matted and tangled, while the yolk upon the wool is so stiff as to render washing difficult. When cleaned, however, the wool is very fine and long. The weight of the fleece is from $2\frac{1}{4}$ to $3\frac{1}{4}$ lbs., and 4 to 6 lbs. in wethers and rams. These sheep, especially the Saxon, are very tender, and require most careful attention, both in regard to the pastures upon which they feed, and the nature of the pasture ground. They are always housed at night, even in the summer, except during the very finest weather, and are never returned to the pasture till the dew is off the grass. During the winter they are kept entirely within doors, and fed with hay, straw, and corn. The Merino sheep were in 1791 introduced into England by George III., although a few had been secured earlier, and the breed is still retained by a few owners. Although the quality of the wool on the English Merinos was quite equal to that obtained in their native country, it was found that they did not possess one of the qualifications which in this country is essential, viz., the principle of early maturity, and the general propensity to fatten. No doubt, however, crosses with the Merino have much improved the quality of the wool of several of our native breeds.

The shipment of Spanish Merinos to the United States, remarks Mr. J. H. Sanders in his book on "The Breeds of Live Stock," began in 1801-2, and between that date and the year 1812, large numbers, probably as many as twenty thousand, were landed and scattered, chiefly through the New England and Atlantic States. A large proportion of the

Merino flocks of the United States, descendants of the importations from Spain, were subsequently interbred with the Saxon and French varieties, until many of the characteristics of these were engrafted upon American flocks. By far the largest number of sheep in the Australian Colonies, in the Argentine Republic, in the United States of America, and at the Cape of Good Hope, are of this breed. "The fineness of the wool-fibre, the lustre of the hair, the unrivalled felting properties, and the great strength of the fibre in proportion to its diameter, all combine to render the Merino a typical wool; and the fact that admixture with almost all other races of sheep introduces many of its characteristics into their wool, as well as renders them capable of extension over a very wide geographical range, has made the Merino sheep one of the most valuable of all domesticated animals, and one which has rendered the very greatest service to the cause of human civilisation."

CHAPTER VI.

DISTRIBUTION OF BREEDS AND CROSSES.

THE localities in which the various breeds of sheep are chiefly maintained are, to some extent, indicated by their names, which in the majority of cases are derived from the districts in which they originated. But in addition to the pure breeds there are numerous crosses; some farmers finding it to be more economical and profitable in breeding for the market to combine the merits of two distinct varieties. However, by far the largest number of the sheep population of the British Islands consist of specimens of pure breeds. It may be interesting to note here that the following counties possess the greatest number of sheep: York, 1,983,763; Lincoln, 1,341,672; Northumberland, 1,042,693; Kent, 1,027,684; Devon, 995,899; Wilts, 626,659; Dorset, 431,757; Cornwall, 477,551; Cumberland, 561,604; Hants, 464,904; Norfolk, 613,418; Salop, 523,689; Somerset, 624,448; Suffolk, 474,747; Sussex, 515,985; Northampton, 477,770; Brecon, 460,888; Merioneth, 406,310; Argyll, 1,042,043; Dumfries, 516,106; Inverness, 677,672; Perth, 764,739; Roxburgh, 504,642.

To indicate roughly the localities of the breeds we may begin with the northern division of the Island. In the north of Scotland the Blackfaced variety predominates, with, however, a number of flocks of Cheviots and a sprinkling of other breeds, such as the Border Leicester and Shropshire.

In the Lowlands of Scotland the Cheviots, Border Leicesters, and Blackfaced are the principal breeds; certain districts crossing the Cheviot and Border Leicester rather extensively. In Northumberland and Cumberland, Cheviots and Border Leicesters, with their crosses, prevail. The Herdwicks are found on the hills of Cumberland and Westmoreland. South Northumberland, Durham, and the Yorkshire moors, together with the Peak district of Derbyshire, have Blackfaced sheep; the hills of West Yorkshire and East Lancashire are occupied by the Limestone sheep, while the Lonks are found in the valleys. There are crosses of the Blackfaced and Leicester in the poorer arable districts of Durham and North Yorkshire. In East Yorkshire and other parts of the broad-acred county there are Leicesters, and the Wensleydales are also a favourite variety. In parts of Notts, Hants, Rutland, Northampton, South Derbyshire, and Leicestershire, the Leicester is chiefly found. The Lincoln sheep is cultivated to perfection in Lincolnshire, and extends to some of the adjoining counties. The Shropshire is the great breed of the Western Midlands; the Cotswold leads in Gloucestershire and parts of Herefordshire, Oxfordshire, and Monmouth; the Oxford Down in Oxfordshire, Berks, Bedford, Bucks, and Herts; the Hampshire Down in Wiltshire and Hampshire; the Southdown in Sussex, Surrey, and Kent; the Romney Marsh in the rich pastures of that name in Kent; the Suffolk in Suffolk, Essex, and Norfolk; the Dorset Horn in Dorset and Somerset; the Devon Longwool in Devonshire, with the Exmoor and Dartmoor in their own regions. In Wales there are the various breeds peculiar to the principality. There is only one special breed in Ireland, the Roscommon; the other sorts kept being Lincolns, Border Leicesters, Shropshires, and their crosses.

It is hardly necessary to explain that although we have, in the foregoing, given a very general indication as to the districts in which the various breeds are found, yet there are flocks of the more popular varieties scattered all over the country—thus the Shropshire is now found in many places

outside the West Midlands, and even in Scotland and Ireland there are a number of very fine flocks. The Southdown has extended to Cambridgeshire (where the celebrated Babraham and Streetly Hall flocks were maintained) and to Norfolk, where the Merton flock made a great mark in the show-yards. Then in Norfolk also we find good flocks of Cotswolds, and representatives of one or other classes will be met with all over the country.

CHAPTER VII.

SELECTION AND MATING.

IT has already been mentioned that breeders of sheep have devoted the greatest attention to selection. In no variety of domesticated animals, indeed, have more remarkable results been achieved by the application of scientific principles of breeding than has been the case with sheep. The notices of the various breeds prove this very distinctly, for many of them have been developed in comparatively recent times. Occasionally we meet with the statement that all the Longwool breeds are simply modified Leicesters, and that all the Shortwool races are equally indebted to the Southdown; but nothing could be more misleading than this sweeping rendering of the facts, because, while, as has been shown, the Leicester and the Southdown have unquestionably exercised a powerful influence, they certainly have not obliterated all the characteristics of the original breeds. Thus we find in the newer breeds not only the mark of the Leicesters or the Southdowns, but also the best features of the old races with which they have been incorporated. Only so much of the Leicester or Southdown blood has been infused as has been found desirable, in order to impart the special qualities of early maturity, or choice mutton, or fine wool, according as either of these properties was desired. Breeders of sheep, while they have thus displayed their capacity to adapt their flocks to the

requirements of the day, have carefully husbanded the best points of the old races. They have always kept steadily in view the needs of the market, whether in reference to mutton, to size, or to wool. If the public became tired of having fat mutton, flock-masters at once set about rearing for lean flesh ; if foreign competition flooded the markets with large joints, and the best prices were consequently paid for smaller carcases, then the breeders adapted their stock accordingly ; and if fashion brought into vogue a new description of fabric, the wool has been altered to meet the demand. We therefore see in the cultivation of sheep the most intelligent adaptation of the principles of breeding to the necessities of the time. It is this close touch with market needs that has led to the production of so many varieties and to the rapid changes in their character. It will probably be found that these alterations will still go on, as there is very little chance that sheep-breeding will ever be merely the working out of a stereotyped plan. Doubtless, as in the past, the owners of flocks will respond as quickly as ever to the call of the market. In short, the breeders of sheep have been the masters of the laws of breeding, and have steadfastly resisted any attempts to be placed in the fetters of custom ; they have used the principles of breeding to further their own ends, and, as we have said, are likely to continue to do so. At the time of writing (1893) the importations of foreign mutton are very large, as they have been for some years. In this way there is an abundant supply of cheap wholesome food, which however lacks the flavour and quality of the home-bred mutton, and those who can afford it will always give a higher price for the latter. The object, therefore, of the home breeder is to produce the very best description of mutton, for which there is an increasing demand. At the same time foreign nations resort to the United Kingdom for home-bred rams and ewes of the mutton and wool producing varieties, and this trade is also extending, so that despite the severe pressure of competition the flock-masters in this country have still encourage-

ment to persevere in the work of improvement, and to maintain and enhance the reputation of our breeds of sheep.

In the selection and mating of sheep, the same rules of course apply as in the case of other domesticated animals. An elaborate discussion of these principles is unnecessary in this treatise, but it may be briefly stated that the law of heredity and its various modifying circumstances, such as atavism or "throwing back" to remote ancestors, must always be kept in view. The merit of a flock can be maintained and increased by a rigorous drafting of ewes that do not reach a high standard of merit in respect of robust constitution, perfection of form, or excellence of quality, and by the selection of rams suited to the character of the flock. A great deal can be done in the direction of obliterating undesirable qualities by introducing rams that are strong in the points in which the ewes may be defective. The gradual building up of a high-class flock necessitates constant care, and affords an opportunity for the display of the breeder's art in all its branches. Time, trouble, and money are necessarily involved, but the return, if there is no ruinous outbreak of disease, is as certain as it can be as regards any class of stock.

In his "Observations on Live Stock," written at the end of the last century, George Culley, with the Dishley Leicester in his eye, gave the following description of what he regarded as a perfect male specimen of the breed: his head should be fine and small; his nostrils wide and expanded; his eyes prominent, or rather bold and daring; his ears thin; his collar full from his breast to his shoulders but tapering gradually all the way to where the neck and head join, which should be very fine and graceful, and perfectly free from any coarse leather hanging down; the shoulders should be broad and full, and at the same time joining so imperceptibly to the collar forward and the chine backward as not to leave the least hollow in either place. The muscular development (or mutton as it is called) upon the arm and fore-thigh must come quite to the knee; the

legs should be upright with a clean, fine bone, and from the knee and hough downwards equally clear from superfluous skin and coarse hairy wool ; the breast should be broad and advanced well forward, separating widely between the fore-limbs ; the chest should be full and deep, with no falling in behind the shoulders ; the back and loins should be straight, flat, and broad ; the ribs rising from the spine, with a fine circular arch ; the belly should be straight, not bagging ; the quarters long and full, well fleshed down to the hough ; the houghs should stand parallel, neither in nor out ; the twist or junction of the inside of the thighs wide and proportionate to the distance of the fore-arms ; so that the pillars of support accord in due symmetry with each other, well supporting a rounded and developed volume of carcase. The pelt should be moderately thin, and the wool fine, bright, and soft. The nearer any breed of sheep, added Mr. Culley, comes up to this description, the nearer it approaches towards excellence of form.

The author of the first edition of this book furnished a similar description of a typical Southdown, "which so far as mutton is concerned, to our taste at least is almost unrivalled." The head is small, compact, and hornless ; the face of moderate length, and, to use a sculptor's phrase, neatly outlined and chiselled ; the lips being thin and definite, and the space between the nostrils narrow but sharp. The face should be dashed with brownish gray ; the forehead, the ears, and the space between the ears well covered with wool. The eye should be clear and bright, but not prominent. The neck should have a graceful *tournure*, thin at its junction with the head, but enlargening towards the shoulders and chest. The breast should be prominent, wide, and deep. The set-on of the shoulder-blades should be oblique, and the ribs should arch boldly, so as to produce a well-barrelled carcase. The loin should be broad and flat, the rump long and broad, the tail set-on high, that is, on a level with the back, the hips wide, and

close up to the last rib on each side. The belly should be well supported and straight, and also covered with wool. The limbs should be far apart, muscular, and full; the shanks clean, fine-boned, well-knit, and covered with short woolly hair of a rusty grey or brown tint. The fleece should be short, close, fine, curled, and free from kemp or projecting hairs.

We may quote another remark of Culley's which is of general application : "In all animals, of whatsoever kind, those which have the smallest, cleanest, finest bones are in general the best proportioned, and covered with the best and finest grained meat. I believe they are also the hardiest, healthiest, and most inclinable to feed, able to bear the most fatigue while living, and worth the most per pound when dead."

In the starting and building up of a breeding flock, the soil will exercise a great influence. There are, of course, exceptions, but generally light soils, where these are derived from the limestone strata, as the chalk, oolite, etc., are the most suitable for breeding. "Sandy or gravelly land is also healthy, but the natural food, probably from the insufficiency of lime, is less suitable for young stock, and care must be exercised to keep up the fertility by a sufficient addition of such elements as are deficient. Strong land, though growing under good management the best of food, is not, even when thoroughly drained, suitable for a breeding farm. It is the nature of the soil, as to texture and the presence or absence of lime and phosphoric acid, rather than climate that determines suitability or otherwise for breeding. Climate is also an important element, but a suitable breed can be found for the differences that exist in the British Islands." It is always safest to adopt the breed or class of sheep that prevails in a particular district, as these have been acclimatised, and there is a smaller amount of risk than when a new breed is imported. Some varieties are now, however, rendered suitable for widely varying situations, but the farmer who introduces an untried breed must—as experi-

menters generally have to do—buy his experience, which is sometimes a rather costly acquisition.

As this little book will probably fall into the hands of beginners, they will find some useful hints in the following from a paper that was contributed to the *Live Stock Journal Almanac*, by Mr. Edwin Ellis, Summersbury, Guildford, a successful breeder and exhibitor of Southdowns : " Let the beginner first visit the principal summer shows, watch the judging, and examine the sheep for himself, taking notes as he does so for future reference. Let him compare the judgments at various shows and form his own opinions, irrespective of the prize-taking. If he is unable to come to the same conclusions as the judges do, let him get some practical, experienced, and unprejudiced man to go through the pens with him, and reconsider the decisions in a fresh light. He must not be afraid of holding to his own opinions—if he has any worthy of the name—against 'a world in arms,' nor must he forget that the decisions of the best men are not infallible, to say nothing of the decisions of men who have their special fads, or who 'love a title,' or always, if possible, favour the district from which they come. After visiting the summer shows, noting the peculiarities of different flocks, and hearing the comments of experienced men, our friend ought to have formed a clear notion of what the model sheep should be. If he does not get this clearly fixed in his mind, bad luck to him ; he will flounder about in his future selections and purchases, and will be as unstable as water. He should be able to say to himself, ' Now, I have thoroughly made up my mind what my ideal ram is, and what my ideal ewe is, and I am going to breed with my eye firmly fixed on this.' This being done, if he has skill, the eye of the breeder, and good fortune, he may hope to realise his ideal, and to fix it in a permanent type. After the above experience, some notion will have been obtained of the special characteristics of the principal flocks in the country, in so far as they are represented in the show-yards, and if money were no object to the young aspirant, I say,

'Go to the best flock you can find, and at any cost get the best young ewes it contains if the owner will sell them.' But this is not the way for the ordinary agriculturist. He should feel that the usual autumn ewe and ram sales are the best possible opportunities for him to get what he requires, and at a very moderate price. As to the ewes, let him go to such flocks as nearest approach his model, and select such pens as he may consider best, bearing in mind form of carcase, type, style, colour, and quality of wool. As a rule, he will find the best quality in the oldest draft ewes, and these are the ones he should buy. Sometimes pens are very badly drawn, and he may find himself obliged to buy three indifferent ewes in order to get two good ones ; but if he will make up his mind to get rid of the indifferent ones, even at a small sacrifice, this does not matter much, such ewes going generally at a very reasonable price. Nevertheless, it is a great mistake on the seller's part not to put together well-matching pens, carefully assorted, as they rightly attract attention and competition. In four cases out of five, as I have previously said, the oldest ewes are the best in the sale. They would not have been kept in the flock so long had they not been considered first-class, and consequently their age is in some respects their highest recommendation. By attending some of the principal sales a large number of good old ewes may be picked up for very little money, and although they will vary more or less in type and colour, yet this will soon be overcome in their offspring by careful mating. Now, if judgment has been exercised, there are collected together some of the finest bred ewes in the country—capable of breeding lambs of the best possible type—at a trifle over their value as mutton. If there is now and then a broken mouth amongst them, a little trouble in chopping the food will be amply repaid, and even if the ewe only brings one lamb, that one may be equal to the best of those left in the flock from which the ewe came, provided it has been properly sired. As to rams, the best possible animals should be obtained. As to

whether they are hired or bought signifies but little. It will often be found cheaper to hire than to buy, as a breeder may be able to spare an animal for one season that he would be very reluctant to part with altogether. In selecting a ram, always if possible see his mother. I have known cases where a grand ram got poor progeny, but never in those cases where the mother was perfect. It is desirable to have a ram to every fifty ewes, and the greatest skill is required in properly selecting the ewes for each individual ram. To set off the deficiencies of one by the excellences of the other is the most responsible task, but if carefully and cleverly done a uniformity of type may soon be obtained which will not be surpassed in the oldest of flocks."

It should be noted that a number of Sheep Societies have been formed and Flock Books published. The latter, however, in most cases register the pedigrees only of rams—a wholly different system to that carried out in reference to pure breeds of horses and cattle, in which cases both sides of the pedigree are fully recorded.

CHAPTER VIII.

MANAGEMENT AND FEEDING.

In the management and feeding of sheep such wide variations prevail in practice that it would be useless to lay down rules that would profess to apply to all cases. We shall therefore mention a number of facts of a general character as regards breeding flocks, and then introduce a description of the actual operations in a few typical establishments.

The period of gestation of the sheep varies from 143 to 156 days, the usual period being 150 days. A table of lambing is given below :

EWE

When Served.	Will Produce on						
Jan. 1	May 29	Apr. 1	Aug. 28	July 1	Nov. 27	Oct. 1	Feb. 27
," 14	June 11	," 14	Sept. 10	," 14	Dec. 10	," 14	Mar. 1
Feb. 1	," 29	May 1	," 27	Aug. 1	," 28	Nov. 1	," 30
," 14	July 12	," 14	Oct. 10	," 14	Jan. 10	," 14	Apr. 12
Mar. 1	," 28	June 1	," 28	Sept. 1	," 28	Dec. 1	," 29
," 14	Aug. 10	," 14	Nov. 10	," 14	Feb. 10	," 14	May 12

The working year in a flock may, however, be said to commence before the rams are put to the ewes. As soon as the previous crop of lambs have been weaned in summer, the ewes are carefully inspected, and imperfect specimens

are drafted to be fattened for sale. Ewes are not usually retained for breeding purposes after they are five years old, even in pure-bred flocks, although, of course, there are instances in which they are kept longer. As regards the young ewes, they should not be put to the ram until they reach the age of eighteen months, when they will have attained a state of healthy maturity. In some flocks ewe lambs are bred from, but the practice is not as a rule desirable. The general plan is to use the rams when they are shearlings, but in many flocks ram lambs are employed with good results; and favourite rams, especially prize-winners, are kept for several seasons. When the ewe flock has thus been assorted by the feeding off of those that have through age or infirmity become unfit, they are liberally fed upon rich pasturage, or are supplied with turnips, or cabbages, or kale. A run in a field of rape is recommended, and also a bite of white mustard, while if green food cannot be obtained, $\frac{1}{2}$ lb. of oats or $\frac{1}{4}$ lb. of cake daily to each ewe will effect the object which is desired—that is, to “flush” the ewes and make them in such condition as that they will readily take the ram. If the ewes, having been kept in fairly good condition previously, are thus generously dealt with for about ten days or a fortnight before the admission of the ram, it is considered probable that the crop of lambs will be more abundant, and doubles and triplets more frequent than if the ewes were in poor condition at tupping time. Of course, too, if treatment has been liberal all along this extra stimulation will be unneeded.

The time when the rams are admitted to the ewes varies according to the climate and system of husbandry in the district. In some parts the first week in September is chosen, but the season goes on in the late hilly districts up to the last week in November, or early in December. The guiding consideration is the conditions that will prevail at lambing time. Thus, where the climate is favourable, where there is good shelter and early food, the breeding is arranged so that the lambs are dropped in

February and early in March. In the south and west of England, in the case of the Southdown and Hampshire Down flocks, the rams are admitted to the ewes at the end of August and in September; but in the northern counties October is the usual month. The Dorset ewes lamb in December, so that their tupping season is not later than July. For raising early house lambs which will be fat before Christmas, the ewes are put to the ram in May and June. In hilly, moorland, and mountain districts, the season is from the latter part of October to the end of November, while upon the Welsh mountains, the Lake district, and the Yorkshire fells, the month of December is begun before the tupping has been completed.

One ram to sixty ewes is the usual proportion, if the male animal is young, vigorous, and robust, while an older ram will be allowed from thirty to forty ewes. The ewes selected for each ram should be placed in a separate enclosure to which the ram is admitted. The ram is dressed underneath with dry red ochre, so that progress or want of activity may be noticed by the marks left upon the ewes. Calculation as to the date of the fall of lambs, whether early or late in the season, is assisted by using upon the ram red ochre for one week, blue ochre for the next, and another colour for the following week. As the ewes are served they should be marked with a small spot of paint, as this helps to identify those that will lamb early.

The subsequent treatment of the ewes after the rams have been removed, is the next matter. They should be spread thinly over the clover leys and the pastures. The object at this stage is to avoid the extremes, either of allowing them to get into too high condition, or of stinting them of proper nourishment. Fat ewes produce small lambs, and are more liable to inflammation in lambing than those that have been moderately kept. If, however, the ewes should get into a weak state, owing to severe weather or scarcity of food, they should be assisted before lambing by the provision of a moderate supply of cut

swedes, and a ration of one pound of oil-cake daily, by which means condition will be maintained, and a more abundant flow of milk will be promoted. The great aim in managing in-lamb ewes should be, as has been indicated, to keep them in fairly good condition all along. To allow the ewes to run over the land to pick up the decaying mangel or swede tops is very dangerous, and is frequently the cause of abortion.

As the time for lambing approaches, a moderate supply of pulped roots, mixed with straw chaff, with hay accessible in cribs, forms a good food. Some give a daily allowance of a mixture of crushed oats, beans, malt coombs, and oil-cake ; but this is not generally considered to be expedient, as the artificial food should be postponed until after lambing. It is scarcely necessary to add that ewes heavy in lamb should be gently treated, and that all violent excitement, such as is frequently caused by over-driving, or "dogging," should be prevented. Nor should they be exposed to the inclemency of the weather, especially to a combination of cold and wet. It is most important to provide a firm and dry lair for the sheep. Cold alone will not harm them if they are healthy. Professor Wrightson very neatly summarises the rules for the management of ewes in lamb, as follows : (1) a firm and dry lair ; (2) plenty of dry fodder, and (3) care, gentleness, and regularity in treatment.

Where there is no permanent lambing-yard, a temporary erection should be made, and in it the ewes can be sheltered during the cold, rainy weather, or during heavy snow-storms. These temporary lambing-pens, in the case of large sheep-farms, are situated in convenient places with regard to the subsequent feeding arrangements for the flock. It is desirable to have the pens constructed on a gentle slope towards the south, and the enclosure should be of a simple and inexpensive character, the materials being a few poles and hurdles lined with straw. A portable house should also be provided for the shepherd, as the

time has now come for the exercise of his best abilities, and the property of the flock-master is in a special manner under his control.

If the ewes have been well managed from the time when they were put to the ram, and are now in good condition, the parturition will probably proceed without much trouble; but if the sheep have been neglected, this is the time when the owner is likely to receive a severe punishment for errors that may have been committed much earlier in the season. Of course "bad luck" often visits a flock in spite of the best management, and a calamitous lambing season may be experienced among ewes that have never known privation, and that have not been subjected to carelessness. In any case there may be unavoidable accidents. One of these results from false presentations. The foetus, if in the natural position, should be found with the head resting upon the two fore-legs, and in that case assistance is not required. The abnormal presentations are as follows: (1) One fore-leg bent back; (2) Both fore-legs bent back; (3) Head fallen down between the fore-legs; (4) Head bent on one side, and laid along the side; (5) Breech presentation; (6) Lamb with legs upwards and back downwards; (7) Back presentation; (8) Side presentation. In these cases assistance will have to be given in delivering the ewe. Inflammation is another cause of considerable loss, and there is also the plague of abortion. After a bad time of lambing, oil, either castor or linseed, should be given to the ewes, as, if the ewe is costive, it often causes straining.

When the lamb has been born, the shepherd should clear its mouth of mucus. It is a general custom for shepherds to blow into the lamb's mouth, as it is supposed that this assists the youngster to draw its breath. The lamb is taken to a crib in the lambing-pen, and will be followed by its dam. The lamb will then get on its feet and suck the ewe, which may receive a few swedes, or a mangel, or one or two white or yellow turnips with a little hay. When a ewe has not a

sufficient supply of milk for her offspring, cow's milk may be used ; but it must be supplied with prudence, as it has a tendency to upset the young animal. If the lamb is weak it should be placed near a fire, and a teaspoonful of gin in a little warm water, sweetened with moist sugar, may be given with good results. Lambs are frequently affected with diarrhoea, and in this case a teaspoonful of castor oil will be beneficial.

Losses of ewes from inflammation after lambing are frequent, these occurring as the result of difficult parturition. Before assisting a ewe in lambing, when this is necessary, the shepherd should anoint his hand with fresh lard or oil ; the hand should be scrupulously clean, and the finger-nails short. Then when the lamb has been removed, about two tablespoonfuls of carbolic acid and oil should be poured into the womb, while any of the external parts which seem to be inflamed should be smeared with the same mixture. This treatment should be repeated every three or four hours as may be found to be necessary. The strength of the carbolic mixture should be regulated thus : from five to twenty parts of Gallipoli oil to one of Calvert's best carbolic acid, according to the symptoms of the case.

During the first fortnight lambs subsist entirely upon milk, but they very soon begin to nibble at food. The ewe should be liberally fed in order that her milk may be both plentiful and rich, and an allowance of one pound of cake per head per day may be given in addition to hay and turnips. In the Hampshire district the ewes after lambing get mangels with hay chaff for about ten days in the lambing pen, and in addition to this food the ewes having tup lambs or couples receive either one pint of oats or one pound of cake ; but unless roots are scarce the remaining ewes are denied artificial food. At the expiration of ten days or a fortnight the ewes and lambs go on turnips, and remain there until March 20th. About this date the ewes and lambs go into the water meadows by day and are folded at night on swedes for the first fortnight or so, and afterwards on Italian rye grass or

occasionally on rye and winter oats which have been sown where rye grass has failed. This treatment is continued until the middle of May, when the lambs are weaned. Vetches are also a valuable food for sheep on arable land. Care should be taken that the food is not too luxuriant. The sudden transfer of lambs from bare to rich pasturage is a great error in management, and causes much loss.

The period for weaning the lambs varies. The improved breeds remain with the ewes for the shortest time, and with mountain sheep a longer period is given. The time ranges generally from May to July.

The male lambs that are intended for feeding for the butcher, are castrated when they are from two to three weeks old. Sometimes these, as well as the other lambs, are docked or tailed at the same time, but it is held that this treatment is too severe, and it certainly seems to be desirable that there should be an interval between the two operations.

Shearing takes place in May or June, and in flocks that have been on arable land the clipping of the fleece is usually preceded by washing the sheep, but this practice, which involves a certain amount of cruelty and a good deal of trouble, is not increasing in popularity, and there is no apparent reason why it should do so. It has been the custom for wool buyers to offer a very low price for unwashed wool, but recent discoveries in the manufacture of woollen fabrics have tended to remove the difficulties of dealing with the article that has not been washed on the sheep's back. Moreover, the bulk of the enormous imports of foreign and colonial wools reaches the market in the grease. It is very important that wool which has not been washed on the sheep's back should be carefully sorted, and defective and dirty pieces removed. With Scotch mountain sheep the practice of washing is not carried out, but it may be necessary when sheep have been turnip-fed on the land to wash at least a portion of the flock. When the sheep are washed, an interval

of eight or ten days should be allowed to elapse before shearing, as the yolk will then to some extent rise again. It is a curious circumstance that it is chiefly a valuable constituent like the yolk which is washed away in the cold bath into which the unfortunate sheep have been plunged. The introduction of shearing machines will greatly lessen the labour of removing the fleeces from sheep.

Dipping is resorted to in order to prevent the attacks of parasites, and it is usually done twice a year, summer and winter dips being prepared for the purpose. The first dipping should take place in early summer soon after shearing, and the second after the flock has been made up for the winter. The dips are poisonous and non-poisonous, and it must be left to the flock-master to decide as to which of the numerous preparations that are in the market he will select. It is important that the printed directions should be strictly observed in using purchased dips.

In the foregoing notes we have given a general account of the management of a breeding flock, but as we have already explained, the details of practice vary so much that it is impossible thus to describe the several methods in a manner that would be likely to help the young breeder. We therefore furnish a few notices by experienced breeders of the methods of flock management as pursued in different parts of the country, and here we avail ourselves of contributions that have from time to time appeared in the *Live Stock Journal*.

Mr. Charles Howard, Biddenham, Bedford, a breeder of Oxford Downs, says: The ewes are generally put to the rams about the second week in August, and are from that time, with the run of the stubbles, the scavengers of the farm. I usually grow some white peas for the use of the rams; immediately these are harvested the stubble is either ploughed or dragged, and mustard sown, which is ready at the latter end of September, and upon it the ewes are folded at night. After this is disposed of, they run on the grasses, and are folded at night upon the land where

the mangels have been drawn. A few kohl rabi are generally sown with the mangels, and are left for consumption by the ewes. After this they generally consume the cabbage sprouts, and are then supplied with some dry food. Approaching lambing time they are placed in comfortable yards at night, and have a supply of chaff and straw, with some bran, oats, and mixed cake. Previous to lambing I give them as few roots as possible. After lambing they run upon grass adjoining the yards, and when the lambs are strong enough they are placed upon the roots, with lamb hurdles for the lambs to run forward on the tops, and have a supply of bran, oats, and cake crushed very small. I think it desirable to get them out of the yards as soon as possible ; this of course depends upon the weather and the strength of the lambs. After the turnips are consumed they are placed upon winter oats and tares, or the grasses, until the clovers are ready, the ewes being plentifully supplied with wurzels. The lambs are weaned in June, and are placed as soon as possible on the after-maths of clovers and grasses, when a supply of cabbages is drawn to them, which generally lasts until September, when a few white turnips of an early variety are ready for them, upon which they are folded at night. The feeding tegs get permanently settled about the middle or latter end of October upon roots, which are sliced for them, and have a supply of clover chaff, and $\frac{1}{2}$ to $\frac{3}{4}$ lb. mixed cake and split-peas, which is increased as the season advances to 1 lb., being then composed of mixed cake, split-peas, beans, peas, maize, and a little malt. The ram tegs are somewhat more generously treated. The breeding ewe tegs get a good supply of clover chaff, and about $\frac{1}{2}$ lb. of mixed corn and cake. The feeding tegs are ready for market between February and April, being between twelve and fourteen months old. Those sold in the former month are in the wool ; those in April are shorn, and weigh from 10 to 12 stone, and as they are of excellent quality they command a good sale for the London market.

The system of management in the flock of Hampshire Downs that belonged to the late Mr. William Parsons, West Stratton, Micheldever, was as follows : On the 1st of August the rams were turned with the ewes, care being exercised as to suitable mating. At that time the ewes were on late vetches, or rape, or aftermath clover, following the ewe lambs, and they ran in the stubbles, but they did not enter the young seeds. The lambs were fed on the seeds during the day, and when the tares and clover were gone they got, at night, a fold of rape and turnips, sown together. When the ewes had fed by day in the stubbles, they followed the lambs at night and cleared up their folds for them. At the end of September the whole flock was folded on the lattermath sainfoin in the day-time (the young animals going before), and on turnips at night. This food often lasted until Christmas. When the sainfoin was finished the lambs received turnips, and $\frac{1}{2}$ lb. of cotton-cake. When lambing time approached, a little before New Year's Day, the forward ewes were separated from the others, lot by lot as they came on, and were placed in a straw fold at night. As they lambed their places were taken by others, and in about a week after lambing the couples were put on turnips, with a straw fold at hand for shelter in bad weather. Those ewes which had produced twins got 1 lb. of cake, and this quantity was increased to $1\frac{1}{2}$ lbs. daily in the course of a month or six weeks. The other ewes received $\frac{1}{2}$ lb. of cotton-cake, and they all had in addition pea chaff, at the rate of two bushels of 16 lbs. per bushel per hundred ewes. The twins got corn as soon as they would eat it, with cake and split-peas. The usual weaning time was the second or third week in April. Until weaning, the ewes received as many turnips as they would eat, with chaff in addition, and swedes when the turnips were over.

Mr. Alfred Mansell, College Hill, Shrewsbury, thus describes the management in a first-class flock of Shropshires : The ewes are put to the ram early in September,

so as to drop their lambs at the end of January or February. The ewes at this period are kept on the second year's seeds, or a fresh pasture is preferred, as the ewes go faster to the ram. If any of the rams show inability to perform their work a teaser is used, and the ewes as they come on are brought up to the ram. Should any of the ewes turn again several times and the season get far advanced, a ram lamb is resorted to as a last resource and generally with success. The breeding ewes run on old grass seeds or grass land in winter, and receive daily a few whole turnips, about 10 lbs. each. When lambing commences they are folded at night. The ewes and lambs are kept in for a day or so and receive a few oats, bran, cut roots, and a little hay, and then go to the young seeds, the twins as a rule getting the best pastures and about half a pound of oats and bran per diem, and the singles none. The lambs' ears are all punched numerically for the purpose of keeping correct pedigrees, and when any of these are passed into the breeding flocks metallic numbers are used. The castration of the ram lambs takes place when the lambs are six weeks to two months old, and considerable care and judgment have to be used to select the best lambs for breeding purposes. This seems to be a very early period to select the rams, but if kept later the risk of loss is much greater. The lambs are usually shorn, as it is considered they grow faster, are freer from the fly, and do better on turnips in winter as they do not carry so much dirt. The shepherd, as an encouragement to do his best, gets a bounty for every lamb over the number of ewes that are alive on May 1st. The lambs are usually weaned in May or June, and divided into their respective classes, viz. rams, wethers, and ewes; and have a small allowance of peas and linseed-cake or aftermath seeds, and then go to the young seeds as soon as cleared. This usually carries them to September, and they then go on to rape or common turnips, and latterly to swedes. The ram lambs, which are never close folded, as it tends to fatten and not to develop muscular strength,

only have at this period turnips cut, but subsequently the turnips are cut for all, and as winter advances, the cake and corn are gradually increased and clover is given in the racks at night. These are the cheapest and best racks I have ever seen, being very light and durable. They simply consist of 9 inch by 1 inch deal boards, with about 2 feet 6 inches upright spars of $1\frac{1}{2}$ inch by 1 inch deal, with a light rail on top, both of which are carried round at the ends to join the two sides together, and should not cost more than ten shillings each. The wethers are sold off by February, and usually weigh about 20 lbs. per quarter. The shearling ewes and rams are kept on turnips until the land is wanted for barley sowing, and the rams intended for show purposes are shorn as soon as April comes in and housed, the remainder running out a month or so longer. The rams then get mangels, hay, and a daily allowance of corn, and as the year advances vetches and cabbages come in, and the allowance of corn is, if possible, lessened.

Mr. Edwin Ellis, Summersbury, Guildford, in his Southdown flock, finds that the ewes do not begin to take the ram until the latter part of August, so that lambing commences early in February and is completed by the end of March. When the ewes have gone half their time, they are well fed, receiving a little hay, and sometimes a few oats, but no roots if they can be avoided. After lambing they are very liberally fed—good hay, swedes, and swede tops if there are any, and sometimes a few mangels being given. It is considered that mangels are better than swedes for milk. The ewes are driven into a fold if the weather is bad, otherwise they do better in the open field. Directly the lambs begin to feed, they have a pen into which they can run, and sliced swedes, corn, and cake are given them. If there is a large proportion of twins, a separate flock is made, and the ewes have some corn in addition to their other food. The lambs are generally about twelve or fourteen weeks old when they are weaned. When the

lambs are taken away, careful attention is given to the ewes' udders for the next few days, otherwise great pain and possibly inflammation may be caused by the milk. The lambs are kept on tares, trifolium, thousand-headed kale, and clover, each in its turn; and if it is found practicable to give a change of food to the ram lambs it is beneficial—the greater variety the better. Directly the wool is off the ewes they run on the commons, and come on to the meadows when the crop of hay has been harvested.

Mr. T. S. Minton, Montford, Shrewsbury, has the lambs in his Shropshire flock in February and March. During March, April, and May the ewes and lambs are on seeds one and two years old, the ewes receiving a few mangels at first, and the lambs a few split-peas (in a pen made on purpose in the centre of the field) during the latter part. In June the lambs are weaned and put on a sweet pasture, receiving a small allowance (two or three ounces) of corn, where they remain until the clover aftermath is ready, which generally lasts them until July and August. During the last few years the custom has been to shear the lambs in June, as it is considered they grow better, are not troubled much with the fly, and keep much cleaner when on the turnip land in winter. In September the lambs go on to the young seeds on the cleared barley stubbles, still receiving their corn, and here they remain until the middle of October, when they are gradually moved on to white turnips, where in the course of a week they remain altogether, and receive a quarter of a pound of corn and some clover hay in racks. The hurdles are moved daily, and they bite their own turnips for the first month, when they are then cut into fingers. White turnips generally last till Christmas, and then swedes commence. The allowance of corn is then gradually increased to half a pound. When on turnips they receive their corn the first thing, then a feed of turnips. During the morning the clover is put in racks, and there is another feed of turnips in the afternoon.

Mr. Henry Dudding, Riby Grove, Grimsby, has a large flock of Lincolns. The greatest attention is paid to the lambs after taking them from the ewes in July. As a rule, they have all got to eat well from the troughs a mixture of linseed-cake, crushed oats, and locust beans, a little bran, malt coombs, and a little cut clover, which make a very healthy food. The most critical time is before getting them on turnips in October. They are especially liable to suffer from the throat worm, which in many cases shrinks them so that they are reduced in value ten shillings a head. After the hoggs, as they are now called, have got a good hold of turnips they improve rapidly without much loss. The great aim in ordinary flocks is to get these sheep fresh or fat for sale in March or April, about a year old. The majority are sold in their wool for grazing in the marshes. The best run, that are clipped and sold fat to the butcher, weigh about 20 lbs. per quarter, and shear about 15 lbs. of wool each.

Professor Wrightson, College of Agriculture, Downton, describing Hampshire Down management at lambing time, says: The forward ewes should be brought into the lambing-pen every night and lie upon the straw. A good-sized heap of swedes should also have been provided, and hay-racks or cribs should be placed around so that the animals may receive a foddering when they come into shelter at about four o'clock in the afternoon. During the height of the lambing the shepherd remains night and day with his flock, and, provided with a good lantern, makes periodical visits, carefully looking at every ewe. As soon as the lamb is born, it and its dam should be removed into one of the coops, or cells, there to remain for three or four days until the lamb is able to follow its mother without difficulty, and until the two thoroughly know each other. When this is judged to be accomplished the cell is vacated for other occupants, and the ewe and her lamb or lambs are transferred to one of the larger divisions of the pen.

As lambing proceeds the various lots of ewes are separated as follows :

1. A yard of ewes heavy in lamb.
2. " " with single lambs.
3. " " with twins.
4. " " and very young lambs.

The older lambs with their dams are, when from four to seven days old, allowed to go out upon the turnips, and it is interesting to watch these young creatures learning to fend for themselves, and imitating their mothers in their eating, choosing the soft parts of the turnips, nibbling at the rape or turnip greens, or sorting out the choicer portions of the hay.

Mr. Herbert V. Sheringham, South Creake, Fakenham, Norfolk, writes : The breeding ewes during lambing time have a pen of turnips every day and a mixture of cut hay and either malt dust or bran, and some of the weaker ones get a little linseed cake in addition to the other food. As soon as the lambs are able to eat, they have a small allowance of lamb food in troughs placed outside the fold (so that the ewes are not able to get it), and the quantity is increased as they are able to stand it. I usually take the lambs off the ewes about the end of May or beginning of June, and run them on trefoil and rye grass until after the hays are off, when they are put on clover and sainfoin eddish, and I like, if possible, to have mangel to throw them until I have some turnips fit for use about the middle or end of August. At this time the lamb food has been increased to about half a pound each. About the 20th of September the lambs begin feeding off the early turnips, having a fresh fold every day, and cut hay and a small quantity of linseed-cake added to the lamb food. This method of feeding continues until the beginning of November, when the sheep go on to swedes, which are put through a turnip-cutter and given them in troughs, the swedes having been previously thrown up into heaps, and the allowance of artificial food is increased to about

three-quarters of a pound each until the last two months, when they get one pound each of cake and corn. These sheep are fit for the butcher at a year old, and the best of them at that age will weigh from 84 lbs. to 90 lbs. each dead weight, and will clip a fleece of from 9 lbs. to 10 lbs. wool. The sheep referred to are cross-breds : Hampshire Down, or Oxford Down, or Cotswold and Hampshire Down.

Mr. J. B. Ellis, West Barsham, Norfolk, keeps a flock of Hampshire Down ewes, and crosses with the Cotswold ram. The ram, he says, is turned to the ewes about the first week in September, and we begin lambing in the first week in February. By getting lambs early, I do not think the fall of lambs is so great as it would be by having the lambs dropped in the beginning of March, but the lambs being forward, they are more able to stand forcing than younger lambs would be. The ewes get turnips, and about half a pound of linseed and cotton-cake per day. About a month before lambing, and after the lamb is dropped, the ewe has 1 lb. of cake per day, with turnips, and hay, and little bits of grass (if any) for an hour or two every evening. This goes on until the turnips are finished, which generally happens about the second week in May ; after that the ewes and lambs are put on to grass, having a fresh pen every day, and the lambs are allowed to run forward, and cabbage or mangels thrown them with what cake and corn they will eat, which would be about one-third of a pound per day ; this goes on till about the first week in June, when the lambs are weaned. And now comes a time when great care must be taken, or very likely much loss will follow. When lambs are weaned, they never ought to be put on grass that has been fed down by sheep before. What I mean by this is, where ewes or other sheep have been. I always try to have a supply of mangel or cabbages all the year round, so that as soon as the lamb can eat roots it has them all through the summer until it goes to turnips in the autumn, though artificial food is gradually increased until it gets to

1 lb. per head, and I seldom give a lamb more. The greater variety of food the better. I therefore always use a prepared lamb food which consists of a mixture of different cakes and corn. In the autumn the lambs are put on turnips, but this must be done gradually, only letting them have a few at first, and they should be on the turnip ground only for an hour or two a day. I always find that when lambs are first put on turnips it is best to cut the tops off the turnips a day or two before the sheep have them ; by doing this, much loss is avoided. After the lambs have been about a month on turnips, we begin grinding or cutting the turnips for them. By this means there is less waste, the sheep grow much faster, and in that way they are kept till fit for the London market about the last week in January, being then about a year old and weighing 8*1*/₂ to 90 lbs. dead.

Mr. George Scoby, Beadlam Grange, Nawton, Yorks, breeds Border Leicesters. Lambs are always dropped in March and April according to climate. The ewes and lambs get cake until June. The last week in July the lambs are taken from the ewes and sent to the best pastures, and the ewes to the worst. The hoggs, as we call them after they are weaned, are changed about from grass fogg, clover fogg, and on to rape in September, when I give cake, $\frac{1}{2}$ lb. each. They go to cut white turnips in November ; after Christmas they get 1 lb. of cake, and hay is always in the racks. I always contrive to have turnips until the first week in May, when I pick my sheep for summer keep, the best gimmers for ewes and twenty good wethers. The twenty kept until Christmas I clip in May. As soon as they come off turnips they run on clover grass. I change them about, first one field and then another, as they do better thus. If it be a bad pasture they get 1 lb. of cake, and a little corn, barley, oats, or wheat, as most convenient. In September they go on rape, and the last week in October they have turnips, hay, and a little more cake, 1*1*/₂ lbs. even, until the Christmas market.

Mr. H. H. Farthing, Thurloxton, Taunton, manages his Dorset Horn flock as follows : The rams are usually put with the ewes the first week in July, and the lambs are dropped between the 15th December and 15th January. The ewes are kept on the pastures during tupping time, and until they lamb. After lambing they are put into some fresh grass, and have a few mangels or turnips thrown about the grass. When the lambs are about a month old the double couples are generally put on to cut swedes, and the single couples on to turnips which are fed on the ground. The lambs are weaned about Lady Day, and turned into the young grass and vetches, and the ewes go to the pastures. It is very essential to give sheep plenty of hay or some corn whilst they are feeding on turnips. Lambs have the best of the keep during the summer, and they require a change every two or three days to be kept healthy. The off-going ewes are generally sold either for breeding purposes or death in May or June ; but some breeders prefer to sell them in-lamb about Michaelmas. The ewe lambs are not generally bred from until they are two years old, when they take the place of the off-going ewes. The wether lambs usually have a little corn all the summer, and about the 1st November they are put on to common turnips for about a month, and then on to cut swedes until about the middle of February, when they are sold to the butcher, and they weigh about 10 stone per head.

The management of a flock of Kent or Romney Marsh sheep is as follows : About November 1st the rams are turned with the ewes, which are generally selected to each ram in different fields, the usual number allowed being forty or fifty ; the rams are changed every fortnight or three weeks, and are removed altogether at the end of five or six weeks. Then the ewes are spread over the pastures according to acreage, two or one and a half to the acre, till lambing time about the end of March, when they are collected into the most sheltered pasture obtainable, and swedes or

wurzel supplied them ; lambing-pens are rarely used, but a few thatched gates, called lews, are set up about the field. As the ewes lamb they are moved out of the lambing field, twins to the best pastures, singles to those of inferior quality ; the former usually get a little corn all the summer, a practice which is found to pay well, as after weaning the twin lambs soon teach the others to trough. The lambs to be saved for rams are stocked soon after birth and treated as the twins are, having the best grass as well as corn or cake ; the remainder are cut at about a fortnight old. If any roots remain after the lambing field is emptied they are given till the grass affords a good bite, when the pastures are stocked with three, four, or five ewes to the acre according to quality, and the remainder of the grass fields are stocked with tegs, or lambs of the previous year, which usually come off turnips about May 1st. About the middle of May the sheep are washed, and shearing begins about the end of the month ; the ram tegs are washed and shorn first, to get them a good fleece of wool for the sales in October. In a moderate-sized flock the shepherd does all the shearing. Soon after he has finished the ewes and tegs about the middle of July he shears the lambs, which average perhaps about 2 lbs. of wool each ; this operation is done mostly for the benefit of the lambs themselves, as, if they are not shorn, their long wool gets dirty in winter in the turnips in wet weather. After the wool has started growing again the sheep are marked with the owner's pitch mark ; there is a special part of the body for marking each class of sheep. The lambs are weaned between July 20th and August 1st, and go on to clover or sainfoin which has previously been cut for hay, with some corn or cake ; at this stage they are allowed as large a run as possible, as close folding is considered injurious. About September some cabbage or rape is ready, and they gradually get on to the turnips and swedes, which keep them till next year's grass is ready ; while on turnips they receive fodder of some sort besides corn ; pea-straw cut into chaff is the most

generally used. With October comes the time for reducing the flock to its winter level, and for reaping the profits of the year's work.

Mr. Jas. C. Bowstead, describing the management of a Herdwick flock, says : The rams and ewes go together from about November 20th until Christmas. The best rams are taken up when they have been with the ewes a month, and are replaced by less valuable ones. The rams are "sullied" red the first fortnight, blue the second fortnight, and black for the remainder of the time. When the rams are taken up the ewes are sent back to the fell until a day or two before the first lamb is expected, when those marked red are brought into the meadows, the blue ones a fortnight after, and the black in another fortnight. This is to avoid crowding, as in the best provided farms the enclosed land becomes very bare before the last ewe and lamb are turned out. The lambs are marked and sent to the fell at about a week old ; the sooner the better when they are strong enough, as except when there are very violent storms, the deaths are fewer on the fell than inside. The ram lambs are castrated at washing time. The lambs are all dipped or sprinkled at clipping time, from 7th to 20th July, to guard against fly, so there is no special gathering on account of the lambs until they have to be weaned, which generally takes place the last week in August. The usual plan is to keep the lambs in the enclosures for about a fortnight, and then send them back to the fell.

Professor M'Cracken gives the following description of the management of Blackfaced sheep : According to the altitude of the run, lambing commences some time in the second or third week of April. Before it is over, about the middle of May, the success of the year can be predicted with tolerable certainty, for should it be stormy or barren, a full crop of lambs is out of the question. The lambs have a close covering of the warmest description when dropped ; but though they can stand

almost any degree of dry cold without flinching much, rain or sleet, particularly when accompanied by scarcity of milk, is sure to occasion severe losses. Cow's milk is supplied when necessary, but those to which much of it is given rarely do well afterwards. Stells, plantations, and other artificial shelters become invaluable at this season. Mortality amongst ewes at lambing, if they be sound, is not usually great, and the practice which many shepherds have adopted of thoroughly disinfecting the hands, together with the free use of carbolic oil in severe cases, tends to reduce it still further. Towards the end of May the lambs are usually marked, all the males which are not required as rams being castrated at the same time. From this time onwards till the end of June the work of the shepherd is comparatively light, being directed chiefly to preventing the loss of ewes or hoggs which may become "cast"—a danger which is greatest when "Keds" are plentiful, and which is not usually of frequent occurrence when dipping has been carefully done. Barren ewes and hoggs are commonly shorn before the rest of the flock. Washing is omitted in the majority of cases, and in Black-faced flocks the wisdom of the practice is more than doubtful; but it is still common towards the southern limits of the breed. Between washing and shearing an interval of ten days is commonly allowed, to permit of the wool regaining something of its lustre and weight. In rolling up the wool a distinction is made between washed and unwashed; the former being wrapped up to show the inside of the fleece, the latter to show the staple. In a fortnight after shearing, the whole of the parasites with which the ewes may be infested will have left them to take up their quarters in the lambs; so that by dipping the lambs in a light carbolic or arsenical dip, the whole of these pests may be got rid of at once. This is an excellent practice which should never be omitted. Careful herding, guiding the flock down to the grassy hollows in the early morning, and as regularly returning them to the dry ridge-tops in the

afternoon, so as to secure the uniform grazing of their pastures and the necessary variety of diet, will constitute most of the work until the time for weaning. From the best farms the wether lambs find their way directly to the butcher; from the poorer grounds to the store markets. On many Highland farms the wethers are kept in separate hirsels till they are two or three years old. Immense numbers of the wether lambs are consumed in our large towns, usually, on account of their small size, in the poorer quarters, although the mutton is at this season the finest grained and the most delicately flavoured in the market. About half the lambs are available for sale; the other half, always the tops, are retained to keep up the stock. The draft ewes form an important item in the year's receipts. They are sent off in the end of September or beginning of October at the age of five or six, after having had four or five crops of lambs. As soon as possible after the draft ewes have been removed the whole flock is dipped. This treatment has now almost universally taken the place of "salving" or "smearing," a laborious operation which had the effect of waterproofing the fleece, often, however, at the expense of the health of the sheep. Shortly after dipping the sheep are again gathered to receive the stock mark in tar or "keel" mixed with oil; a mark of the latter kind is so conspicuous that should any of the sheep stray they can be easily recognised amongst others, even at a great distance. The numbers of the different kinds of sheep are also ascertained and booked at this time. The dipping of the ewes should be over at least three weeks before the tupping season begins, otherwise the poison upon their wool may have an injurious effect upon the rams. The rams themselves may not be dipped with safety within two months of this time. The dates at which the rams are put to the ewes vary, according to the situation of the farm, from the 10th to the 25th of November. In ram-breeding flocks the best of the ewes are carefully mated, so that the pedigrees of the lambs may be registered in a flock book.

Sixty ewes may be safely allotted to a ram, provided each lot be turned together twice daily. It is customary to change the rams after the first three weeks, and by the end of the year they may all be gathered in. A second dipping of the whole flock frequently takes place in the month of February, but the risk incurred in handling ewes so heavy in lamb is an almost insuperable objection.

CHAPTER IX.

MUTTON, WOOL, ETC.

IN the notices of the various breeds, some particulars have been given as to the average weights of sheep, the quality of their mutton, and the quantity of wool clipped. It has also been indicated that, as a rule, the Down varieties give the finest quality of mutton, while the Lincolns and others of that type are more distinguished for the amount and quality of their wool.

The following summary of the results of feeding experiments carried out by Sir John B. Lawes at Rothamsted, and recorded in the Journal of the Royal Agricultural Society of England, will be useful.

Consumption of Food.—Sheep of different breeds consume quantities of food in proportion to their respective weights when at an equal age, stage of feeding, etc.; that is to say, three sheep weighing 100 lbs. each will consume the same quantity of food as two sheep of 150 lbs. each. Sheep on good fattening food—such as cake or corn, with chaff and roots—will consume weekly about $4\frac{3}{4}$ lbs. of cake, $4\frac{3}{4}$ lbs of hay, and about 70 lbs. of roots for every 100 lbs. of their live weight. When fed as above, they will consume every week about one-seventh of their own weight of the *dry* substance of the food—that is, after deducting the moisture it contains.

Rate of Increase.—Sheep well fed and under cover will increase about two per cent. per week upon their weight : that is to say, 100 lbs. live weight will increase from $1\frac{3}{4}$ lbs. to 2 lbs. per week. To increase 100 lbs. in live weight, sheep will consume about $2\frac{1}{4}$ cwts. of cake or corn, $2\frac{1}{4}$ cwts. of hay chaff, and $1\frac{1}{2}$ to $1\frac{3}{4}$ tons of roots. The increase of a fattening sheep is at the rate of about 1 lb. live weight to 8 lbs. or 9 lbs. of the dry substance of the food consumed.

Live and Dead Weights, etc.—Hoggets or tegs, under twelve months old and in a lean or store condition, will contain about one-half of their weight carcase and about one-half offal. Shorn sheep, sufficiently fat for the market, will contain about 56 lbs. of carcase to every 100 lbs. of the unfasted live weight. Sheep in an ordinary state of fatness yield from 7 lbs. to 14 lbs. of offal or loose fat per head according to breed and size, the Longwools giving the least, and the Downs the most.

The following table was given by Mr. Henry Stephens in the “Book of the Farm,” and is believed to be a tolerably close approximation to the truth in a majority of cases to which it may be applied :

Live Weight in lbs.		Per cent. of Mutton.	
		In Wool.	Newly Shorn.
280 to 300	...	71 to 72	74 to 75
260 , 280	...	69 , 70	73 , 74
240 , 260	...	67 , 68	71 , 73
220 , 240	...	65 , 66	69 , 70
200 , 220	...	63 , 64	67 , 68
180 , 200	...	61 , 62	65 , 66
160 , 180	...	59 , 60	64 , 65
140 , 160	...	58 , 59	63 , 64
120 , 140	...	56 , 57	62 , 63
100 , 120	...	55 , 56	60 , 61
80 , 100	...	53 , 54	58 , 59
60 , 80	...	50 , 52	56 , 57

In the above table, the column headed “in wool” applies

only to long-woolled sheep; when Southdown and other short-woolled sheep are weighed in the fleece, two or three per cent. must be added to the tabular proportion of their mutton. The column headed "newly shorn" will apply to all breeds of sheep, without material inaccuracy in the result, except to such as have very large heads and feet.

Another rule is—Weigh the sheep alive, to ascertain weight in stones (14 lbs.); double the number of stones which the sheep weighs will give pounds weight per quarter if the sheep is fairly fat. Thus, a sheep weighs alive 9 stones; 9 multiplied by 2 = 18, or 18 lbs. per quarter. Again: reckon the dead weight to be four-sevenths of live weight. Thus, as above, 9 stones = 126 lbs.; four-sevenths of which, or 72 lbs. = 18 lbs. per quarter.

The offals of sheep weigh, in ordinary cases, as follows:

Skin, without fleece, from	...	...	6 to 10 lbs.
Tallow	...	...	5 „ 14 „
Head	...	...	4 „ 6 „
Feet	...	...	1 $\frac{1}{4}$ „ 3 „
Pluck	...	...	4 $\frac{1}{2}$ „ 6 „
Stomach and Entrails	...	...	9 „ 18 „
Blood	...	...	4 „ 6 „
Loss by killing	...	...	1 $\frac{1}{2}$ „ 3 „
Fleece	...	...	2 „ 6 „
Horns	...	...	2 „ 5 „

In some instances the weight of tallow in sheep is as much as 20 lbs. or 21 lbs., and the fleece of some sheep will weigh as much as 10 lbs. or 12 lbs. The total weight of the offals of sheep may be considered to vary from 40 lbs. to 90 lbs.

WOOL.

The fall in the value of wool has in many districts resulted in a considerable amount of neglect of this important portion of the produce of the sheep. In 1864 the

average value of the fleece was 2*s.* 3½*d.* per pound, whereas now it rarely exceeds 1*s.* But notwithstanding this lessened value, the wool forms a substantial item in the returns from sheep-keeping, and it will amply repay any attention that is bestowed upon it. The quality of the fleece depends to a large extent upon soil and climate, but both the breed and the food exercise a considerable influence on the growth of wool. We have already seen that in ancient times British wool enjoyed a high reputation, and although it cannot now compete with the choicer descriptions grown in sunny climes and freely imported into this country, there is no reason why it should not generally be better than in too many cases it has been allowed to become.

The subject of the composition and growth of wool is a very attractive one from a scientific point of view, and the volume in which Dr. F. H. Bowman deals with it will be found well worthy of perusal. This book is entitled "The Structure of the Wool Fibre," and is published by Simpkin, Marshall, & Co., London.

A fibre of wool is composed of a very large number of complex chemical compounds which are very readily acted upon by various co-agents, and which depend for their best qualities and stability very largely upon the health of the sheep. "When attached to the animal each fibre is implanted in a cutaneous depression or follicle which is an involution of the epidermis, and corresponds with the epidermis in structure layer by layer.

"The fibre is fixed into this follicle and attached to the bottom by a dilation called the bulb or knob of the fibre, which encloses the papilla or pulp from which the fibre is generated. In structure the fibre is built up of a series of cells which undergo modification so as to constitute the different parts during the process of growth. Thus, the fibre is in living connection with the fibrous sheath of the follicle. The fibre itself forms a long more or less cylindrical body, part of which is imbedded within the follicle,

but the larger part is external to it and outside the skin. This portion is termed the shaft or stem of the fibre, and it usually decreases in diameter from the base towards the unattached extremity, where, when uncut, it terminates in a point of more or less fineness.

"The wool fibre is a wonderful structure, being built up of hundreds—nay, even thousands—of individual cells, which are wonderfully co-related to each other and to the general structure of the whole fibre. Some idea of the complicated nature of this structure may be obtained when we state that in a single fibre of Lincoln wool it has been estimated there are no less than 500 to 700 cells in cross section, and 250 in every linear inch, so that there are about 125,000 or more in every inch of length in the staple. These cells differ in form and density in the various parts of the fibre, and it is impossible to injure any of these without impairing the organic unity of the whole and deteriorating its quality as material for use in textile fabrics. The wool fibre consists really of two principal parts, an inner or cortical substance which is composed of long spindle-shaped cells upon which the density and elasticity of the wool depends. This comprises the larger part of the fibre. Outside this cortical substance there is an outer sheath or case composed of flattened horny cells, which bind together the cortical cells, and to this outer or epidermal sheath the lustre and firmness of the fibre are due. This outer sheath is built up in a regular manner, all the scales having free margins or edges which overlap each other, like the scales on a fish's back, or the tiles on a house-top, the free margins always pointing in the direction of the point of the fibre. These scales are always most numerous in fine wool, and they differ in character in every variety of wool ; so much so that we are enabled to distinguish all the specific varieties of wool by the arrangement of the scales, and are thus frequently enabled to detect mixtures of different wools in cloth and other fabrics. In the natural

condition these scales are laid down close to the shaft of the fibre, and are covered all over the surface with a fine gelatinous enamel ; and nature secures that they shall not be disturbed or injured by providing a natural unguent or grease, which is termed *suint* or yolk. This *suint* is a very fatty potash soap, largely soluble in water ; and, by its covering the whole surface of the fibres, it prevents the scales from coming into juxtaposition, and thus all felting action is prevented ; for the felting property of wool is due to the interlocking of these scales.”

DENTITION.

The age of a sheep may be pretty clearly ascertained by its incisor teeth. There are eight incisors, central, lateral, middle, and corner teeth, these being found in front of the lower jaw only, the corresponding part of the upper jaw being provided with an elastic pad. Molar teeth are designated by numbers to indicate their position, and for the purpose of judging the age. Though the number of incisor teeth in the sheep are the same as in the ox, they differ in certain points much as there is a difference in the manner in which the two animals respectively crop the grass. In the sheep they are expressly formed for close feeding, and for nipping off the wiry stalks close to the roots, or even for nibbling harder food, as the shoots of the heath or broom. Not only are the teeth well covered with hard enamel, but this enamel rises on the edge of the tooth for nearly a quarter of an inch, presenting a convex surface outwardly on a concave surface within, so as to form a sort of gouge or chisel, capable of cutting a tough or wiry substance with admirable facility, and also of biting off the grass of the pasture grounds from the very root. The sheep may be said to *nibble* the herbage, the ox to graze.

The following table, from Bennet's Agriculturist's Pocket

Book (Crosby, Lockwood, & Co.), shows the periods at which the teeth are cut :

Temporary Incisors.	Age when cut.	Temporary Molars.	Age when cut.
Central ... }	At or soon after birth.	1st, 2nd, & 3rd.	At birth, or a few weeks after.
Intermediates }			
Lateral ... }	3-4 weeks.		
Corner ... }			

Permanent Incisors.	Age when cut.	Permanent Molars.	Age when cut.
Central	1 yr. 3 mths.	4th	-6 months.
Intermediates .	2 years	5th	9-12 months.
Lateral — ...	2 yrs. 9 mths.	6th	1 year 6 months.
Corner ... —	3 „ 3 „	1st and 2nd... 3rd	2 years. 2 yrs. 3-6 months.

In examining the teeth of the sheep, the mouth should be fairly opened and the teeth counted, and not left to the glance of the eye alone, however practised, for it often happens that at four years old the mouth is apparently full with broad teeth, no small external corner teeth being visible ; but in fact these teeth do exist, but being small or reduced, are displaced by their neighbour on each side, which starting up before them, prevents their being readily seen. Now unless the teeth are counted and fairly examined, the six visible teeth may be taken for eight, and the animal be estimated at five years of age.

When the mouth of the sheep is completed, it is difficult to judge the age of the animal afterwards. The teeth wear down at a different ratio on various pasture grounds, and according to different modes of feeding. Often they become broken, at other times they loosen and fall out, not perhaps from age so much as from constitutional predisposi-

tion, or delicacy of constitution, or from what is called close feeding on scanty and short pasturage, and sometimes perhaps from the influence of locality. One, two, or three years, according to circumstances, may elapse before the decline and fall of the teeth commence ; but when the teeth exhibit these signs of disintegration, the sheep has passed its grand climacteric, unless, indeed, accidental causes have greatly contributed to their destruction. Yet, supposing this to be the case, the loss of incisors to the sheep would in itself be the cause of decline, for on these incisors depends the power of procuring food. In the dog, on the contrary, which often loses its small incisors at an early age, as long as the canines and molars are sound their loss is not materially felt.

How long the farmer may deem it necessary to keep a sheep when, after the sixth or seventh year, its incisors show symptoms of decay, will depend upon many contingencies, and upon motives alien to the common order of affairs ; but neither in wool nor in mutton can he expect much remuneration.

NAMES OF SHEEP.

The sheep acquires different names at different periods of its life, and the same names are not alike applicable to both sexes.

The male is usually denominated a "ram" or "tup." The term lamb is applicable to the suckling young of both sexes ; but the male, until weaned, is distinguished as a "tup-lamb," a "ram-lamb," a "pur-lamb," or a "heeder." When weaned, until shorn (supposing him not shorn while a lamb), he is called a "hog," a "hogget," a "haggerel," a "teg," a "lamb-hog," or a "tup-hog" ; and if castrated, a "wether-hog." After shearing, say when a year and a half old, he is called a "shearing" or "shearling," a "shear-hog," a "diamond" or "dinmont ram," or "tup" ; and if castrated, a "shearling wether." "Hogget-wool" is the wool of the first shearing, supposing the "lamb" was not

shorn while it retained that title. After the second shearing he is called a "two-shear ram, tup, or wether"; next, a "three-shear ram," etc., the appellation indicating the number of shearings. In the north of England, and in Scotland, he is called, until his first shearing, a "tup-lamb," then a "tup-hog," after that a "tup"; or if castrated, a "dinmont" or a "wedder."

The female, while suckling, is a "ewe-lamb," or "gimmer-lamb," or "chilver"; and when weaned, a "gimmer-hog," a "ewe-hog," a "teg," a "sheeder-ewe." After the first shearing she is called a "shearling-ewe," or "gimmer"; sometimes a "theave," or a "double-toothed ewe," or "teg."

Afterwards she is called a two-shear or three-shear, or a "four-tooth," or a "six-tooth" ewe or theave. In some of the northern districts, ewes not in lamb, or that have weaned their lambs, are termed "eild" or "yeld" ewes.

There are besides these, other terms not in general use, but restricted to certain localities, which must be regarded in the sense of provincialisms.

CHAPTER X.

DISEASES OF THE SHEEP.

DISEASES OF THE NERVOUS SYSTEM.

STURDY, TURNSICK, GID (HYDATIDS IN THE BRAIN).

THIS peculiar disease of sheep is caused by the presence in some part of the brain of a watery cyst, which cyst or bag is of a parasitic nature, it really being one stage of the life cycle of a tapeworm, which in its mature worm state infests the bowels of a dog. It is more common in the north of England and in Scotland than in the southern counties. Young sheep are much more liable to be attacked than old ones, it being rare in the latter.

The symptoms are as follows: The lamb or sheep attacked is at first dull, its step is unsteady and reeling; when standing still it has a vacant, unconscious stare, from which state it will start suddenly as if frightened, and will then run into a hedge, ditch, or elsewhere, or it may stop and again assume the stupid, staring condition. Especially does water seem to have a peculiar effect upon sheep suffering in this way, for they will stand and stare at it for a long time, and often fall into it. As the disease advances, these symptoms increase, and the sufferer commences a rotatory movement, moving around in one direction, often for an hour or more at a time. The appetite fails, and the eyesight becomes very imperfect, or is altogether lost. The

poor animal wastes rapidly, and dies from exhaustion and inanition, unless it is destroyed, or killed by falling into water or over a steep place, or becoming cast and so dying from suffocation. More than one hydatid or bladder may be present in the brain of a sheep, and these attain such a size that in bad cases they cause by their presence the absorption of the greater part of the brain; indeed, this takes place to such an extent that often on opening the skull of a victim to this disease, one marvels that an animal could live with such a structural alteration going on in so vital an organ as the brain, and it is only because it is a very gradual process that the sheep continues to live.

Treatment, although often attempted, is not on the whole very satisfactory; therefore when an animal is attacked, it is better to let the butcher have it at once, if it be at all in a condition fit for human food. When treatment is attempted, the only chance of making a cure is to either trephine the skull where the cyst is supposed to be (and this can be done fairly accurately by the bone becoming thin and soft at the particular spot), and removing the cyst with forceps, or the cyst may be punctured with an awl several times at intervals of three or four days, each time allowing as much fluid to escape as possible.

To properly understand the development of this disease it is necessary to know the life history of the parasite which is the one and only cause of it, and it must also be borne in mind that this is a totally distinct disease from Hydrocephalus, or water on the brain, although often confounded with it because some of the symptoms are very similar. To start, then, with the mature tapeworm which is located in the bowels of a dog. Joints or segments containing eggs are detached from this worm and pass away from the dog with the faeces, and so are deposited on pastures, etc., where they are taken up with the food by the sheep. From each egg that is not destroyed during mastication, etc., issues a very small living object provided with a boring apparatus, by means of which it bores its

way into a blood-vessel and is carried by the blood stream to the brain of the sheep, where it again bores through the wall of the blood-vessel into the brain substance (at which time it is known as a scolex), where it undergoes a change and forms a cyst or bladder composed of a cyst wall, with which are connected numerous small white bodies, these in reality being the heads of future tapeworms, and a watery fluid. When a sheep containing one of these cysts is dead and a dog eats the brain, he also swallows the whole or some part of the cyst, and having done so the "heads" on the cyst wall, on gaining access to the bowels of the dog, at once commence to develop into mature tapeworms (which worms are known as *Tenia Cœnurus*), and thus the life cycle is complete. Of course it is only a few in many thousands of eggs or young that ever meet with circumstances favourable to their development.

WATER ON THE BRAIN (HYDROCEPHALUS).

This is a totally distinct disease from the preceding ("Gid"), although it is sometimes confounded with it. It is usually congenital, that is, the lamb is born in this diseased condition, or it may be the result of some injury or disease of the head.

The symptoms are a dull, stupid appearance, with a greater or less amount of unconsciousness, but the circular motion so common in "Gid" is not usually present, and the head is nearly always enlarged.

Treatment is not often attended with success, and cannot therefore be recommended. When attempted, the fluid must be liberated by trephining, and this operation followed by the administration of iodide of potassium and tonics, such as dialysed iron or sulphate of iron.

In some debilitating diseases an abnormal quantity of water is found on the brain, as a result of the extreme debility.

APOPLEXY

Is a very common disease in young sheep that are thriving rapidly, a sudden change of diet or of the weather often causing a number of animals to be attacked in a short space of time. It consists of a sudden engorgement of the vessels of the brain with blood, causing unconsciousness, the eyes and nostrils being dilated, the mucous membranes are of a dark red or purple colour, and the sight is lost. Soon the animal reels, falls, and quickly dies, or inflammation of the brain may set in.

Treatment, when attempted, must consist of bleeding, followed by several doses of bromide of potassium and tincture of aconite. Careful nursing is an essential to the ultimate recovery of an animal from an attack of this kind. Apoplexy is known in some parts of the country by the indefinite term of "Dropping." It is also sometimes confounded with and mistaken for Anthrax, which is, however, a much more serious disease, and will be described under the head of Blood Diseases.

INFLAMMATION OF THE BRAIN, OR PHRENITIS.

As mentioned above, this is sometimes a sequel to Apoplexy, or it may make its appearance as a disease produced by over-stimulating food, or an injury to the head may cause it.

Symptoms: At first the animal is rather dull and listless, but soon becomes excited and frantic; it runs wildly about, pushes its head against some resisting object, and then sooner or later, if not relieved, it staggers, falls, and dies, the immediate cause of death in the rapidly fatal cases generally being rupture of a blood-vessel in or connected with the brain.

Treatment: Bleeding in the early stages often gives great relief; this should be immediately followed by a purgative dose of Epsom salts, and after this bromide of

potassium and potassio-tartarate of antimony (tartar emetic) should be given alternately every twelve hours as long as any violent symptoms remain.

Phrenitis is not unfrequently mistaken for Rabies.

RABIES (ERRONEOUSLY CALLED HYDROPHOBIA), OR MADNESS.

This distressing and fatal disease is always due to inoculation from a previously diseased animal (generally by the bite of a dog), but the time between the introduction of the virus into the system and its manifestation, varies from two to twelve weeks, or even longer.

The symptoms are: Loss of appetite, the sheep chase and ride each other, butt each other or some lifeless object with great vigour, the breath is quicker than is natural, and the muscles twitch, but there is no dread of water. Soon the victim becomes drowsy, saliva flows from the mouth, and there is inability to swallow. The disease usually proves fatal in from two days to a week.

Rabies is among those diseases which come within the operation of the Contagious Diseases (Animals) Act, so that it is necessary for a person having an animal with this malady, or displaying suspicious symptoms of it, to give notice of the fact to the police, and the owner of the animal or animals must strictly follow the directions laid down by the authorities.

TETANUS, OR LOCKJAW.

Although this disease was formerly considered to be a strictly nervous disorder, recently it has been proved that it is due to micro-organisms in the system, these gaining entrance either through an external wound or abrasion, or through the internal organs, for although severe chills sometimes appear to produce Tetanus, it is probable that it is owing to an altered state of the blood that the organisms

which gain entrance to the system through some internal organ are enabled to develop and multiply.

The chief and characteristic symptom of Tetanus is the peculiar rigidity of the muscles of the whole body, the stiffness of the muscles of the face, etc., causing the inability of the animal to open the mouth which gives this disease the common name of Lockjaw.

Treatment is seldom of any avail, owing to the great difficulty experienced in administering any medicine by the mouth in a well-pronounced case. Should treatment be attempted, a purgative should first be given, followed by sedatives such as belladonna, tincture of aconite, hydrate of chloral, prussic acid, nitrate of amyl, and bromide of potassium. Nourishing gruel, eggs, and new milk must be given to support the patient's strength.

EPILEPSY, OR EPILEPTIC FITS.

This disease is generally brought on by some dietetic errors or the presence of worms in the stomach or bowels. The fits come on suddenly, often when an animal gets up after lying down. During an attack the sheep suddenly staggers, falls, and struggles convulsively for a short period, then remains comparatively quiet, and soon gets up again, and with the exception of being somewhat dazed for a time appears but little the worse for the attack.

Treatment: Change of diet, and the administration of bromide of potassium twice daily for several days, are about the best curative measures that can be adopted.

DISEASES OF THE BLOOD.

During health the internal temperature of sheep is very high, and this accounts for the fact that these animals are both very subject to inflammatory diseases, and are also difficult to cure when so attacked; indeed, this is so

well known by practical sheep-breeders that when a sheep shows symptoms of inflammation of any internal organ, they prefer to immediately send it to the butcher rather than run the risk of treatment, except in the cases of valuable breeding animals.

SIMPLE FEVER

Is an altered condition of the blood, generally brought on by a chill or bad food.

The symptoms are : Dulness, shivering, loss of appetite, panting, dryness of the mouth, and redness of the mucous membranes.

Treatment: Put the patient in a dry, warm place, and give a dose of Epsom salts and nitrate of potash in water. Follow this with sweet spirits of nitre, solution of acetate of ammonia, and tincture of aconite, given in oatmeal gruel two or three times each day, and allow a little water containing a drachm or two of chlorate of potash to drink. The food must be digestible and nourishing, such as bran, crushed oats, and hay.

INFLAMMATORY FEVER, OR BLOODSTRIKING (ANTHRAX).

True Inflammatory Fever is really a form of Anthrax, but it is often mistaken for and confused with ordinary Apoplexy, and this error is easily committed, for in both diseases death takes place in a very short time after the commencement of the attack, and the post-mortem appearances, if the carcase be examined soon after death, are very similar; but there is this important and distinctive difference, namely, that by examining with a microscope the blood of an animal that has died from Anthrax, the organism known as the *Bacillus Anthracis* can be discerned, whereas this parasite is not present in the blood of an animal which has died from ordinary Apoplexy. It is important that a correct

diagnosis be made of these cases, because Anthrax is included among those diseases which come under the operation of the Contagious Diseases (Animals) Act, and a person having, or suspicious of having, a case of this malady among his stock is bound under a heavy penalty to report it to the police, and these, with the veterinary inspector of the district, deal with it as the law directs.

VARIOLA OVINA, OR SMALL-POX,

Is another highly infectious and contagious blood disease, which comes under the operation of the Contagious Diseases (Animals) Act, but fortunately it has been so controlled in this country that cases of it are very rare, and when they are met with it is in sheep that have recently been imported from abroad ; and as these all undergo a searching examination by a veterinary inspector at the port where they are landed, a detailed description of symptoms would be of little use to an ordinary stock-owner.

The characteristic symptoms are the presence of eruptions on the skin, which are first detected as small hard lumps, the skin over them having a reddish hue ; the redness increases, giving them the appearance of large flea-bites. The lumps then are visible to the eye, and soon a liquid forms in their centre which is at first of a watery nature. Then the centre of the lump becomes depressed, the vesicles then rupture and a scab is formed, which, if the sheep survives, becomes detached after a time and falls, or is rubbed off, leaving a depression or pit. It is a very fatal disease.

BRAXY,

Like murrain as applied to cattle, is a name given to a variety of diseases, and the term is often used as a cloak for ignorance. It is, however, to a fever of a low typhoid nature which sometimes attacks sheep, that it is perhaps most commonly and suitably applied.

This diseased condition is generally brought on by improper food, or is a sequel to some other disease. When suffering from this ailment the sheep is dull, has not much appetite, sometimes purges, and at others the bowels are constipated, the wool becomes loose, and there is general feverishness to a greater or lesser extent.

Repeated doses of quinine and tincture of aconite, with an occasional dose of Epsom salts if the bowels are constipated, accompanied by the administration of milk, eggs, and gruel, is the line of treatment to be adopted in these cases.

RHEUMATISM.

This is another disease in which the blood undergoes a considerable change. It is most commonly seen in young lambs, when they are lying on damp ground in cold weather.

The symptoms are stiffness, swelling, and tenderness of the joints, which shift from one joint to another. In some cases the neck and loins are the chief seats of the disorder. Considerable fever is always present.

Treatment.—Give a dose of Epsom salts and saltpetre, followed by salicylate of soda, or salicylic acid (dissolved in solution of acetate of ammonia), tincture of colchicum, and tincture of aconite, for several days. Bicarbonate of soda may also be given in the food with advantage. Keep the patients dry and warm, and if the appetite fails, drench with oatmeal and linseed gruel. The swellings should also be rubbed with white oils or opodeldoc.

EPIDEMIC CATARRH, OR INFLUENZA.

This disease, which attacks the air passages, causing inflammation of the mucous membranes of these parts, is in all probability, in sheep as in the horse, due to the presence of micro-organisms; hence I class it among the diseases of the blood.

The symptoms are general feverishness, sneezing, coughing, more or less dulness, eyes bloodshot, and discharge from nostrils, which is at first watery, but afterwards becomes purulent.

Treatment should consist of protection from inclement weather, and the administration of febrifuge medicines, followed by tonics such as sulphate of iron and gentian given daily in the food.

If the animals are not sufficiently ill to require drenching in the earlier stages of the affection, chlorate of potash may be given in their food twice daily.

SCROFULA.

Sheep are subject to a scrofulous condition of the system which manifests itself in different ways, the most common being the formation of strumous abscesses about the head, neck, and face, constituting the so-called "Hog-pox," and a peculiar diseased condition of the nasal cavities from which a profuse discharge issues, and which in some cases extends to the throat, threatening suffocation. Sheep that are highly bred are those most subject to this latter disease, especially when they are bred in-and-in. Treatment of scrofulous subjects is not as a rule satisfactory, and when a sheep is known to be suffering in this way, it is far better to at once send it to the butcher, than to attempt to cure it.

TUBERCULOSIS, OR CONSUMPTION,

Is at present an incurable disease when once fully developed, and whenever a sheep is noticed to have a persistent cough, wastes, (and especially if diarrhoea sets in,) tuberculosis may be suspected, and immediate slaughter is to be recommended.

FOOT-AND-MOUTH DISEASE (*Eczema Contagiosa*).

This is a very contagious and infectious disease, which never arises spontaneously in this country, but has repeatedly been introduced from abroad. It is due to a specific virus or germ, the virulence of which is owing to the presence of a micro-organism having the power of rapid multiplication, when introduced into a suitable medium such as the blood of sheep and many other animals.

The symptoms are, a sudden rise of temperature, feverishness, lameness, refusal of food through soreness of the mouth, which is caused by fairly large white vesicles on the tongue and dental pad. These soon rupture, leaving a raw, ragged ulcer. Similar vesicles appear between the claws and around the coronet, causing intense lameness.

This disease is another which comes under the Contagious Diseases (Animals) Act, and consequently must be reported to the police of the district.

Treatment is not allowed except under supervision, and by order of the local authorities.

SEPTIC METRITIS, OR BLOOD POISONING FROM THE WOME,

Often makes its appearance in flocks, causing great inconvenience and loss. It occurs from a few hours to three days after lambing, and is due to the entrance of a specific virus or poison into the genital organs of the ewe, which being in a congested and lax state from the recent act of parturition, generally accompanied by a rupture (even if slight) of some of the vessels by laceration or otherwise, a ready means of access to the system is made, and the virus, whose activity is due to living organisms, having gained entrance to the system through the blood, rapidly increases in quantity, and so kills the unfortunate ewe. This disease is very contagious. When, therefore, one case happens in a flock, the shepherd or attendant should take every precaution to prevent it spreading. No

person who has attended a ewe suffering from this fatal disorder should go near other in-lamb ewes before undergoing thorough disinfection, both of his person and his clothes; neither should healthy sheep be allowed to go near a sick one, nor come in contact with any litter, discharge, or other material that has been near a case of Septic Metritis.

The symptoms are, great dejection, shivering, total loss of appetite, straining, accompanied by the expulsion of a dirty brownish and badly smelling fluid. Loss of power in the hind-quarters follows, and death takes place in a period varying from a few hours to three days.

Treatment should consist of the administration of a dose of Epsom salts, followed by salicylic acid (dissolved in solution of acetate of ammonia), quinine, tincture of aconite, chlorate of potash and laudanum, or chloral hydrate, to check the straining.

The womb should be syringed out two or three times each day with a solution of carbolic acid or Nocard's solution of bichloride of mercury, to either of which two or three tablespoonfuls of laudanum may be added each time to reduce the irritability of the womb.

DISEASES OF THE RESPIRATORY ORGANS.

INFLUENZA, OR CATARRH,

Is brought on by sudden changes of temperature, exposure to wet, etc. It often attacks a number of sheep about one time, and consists of inflammation of the nasal cavities, which in severe cases extends to the windpipe (trachea) and bronchial tubes. It is attended by feverishness, and discharge from eyes and nostrils.

It is not a very fatal disorder if the cases are attended to as soon as they are observed, and the patients protected from inclement weather. A few doses of sweet spirits of

nitre, tincture of aconite, and chlorate of potash, administered in a little oatmeal gruel, should be given.

GADFLY.

The nasal cavities of sheep are infested by parasites, the most common of these being the larvæ of the *Œstrus Ovis*, which are of a similar shape to the "warbles" seen in the backs of cattle.

The *Œstrus Ovis* or sheep gadfly lays its eggs in the nostrils of sheep in the summer months, and it is in their attempts to avoid this fly that sheep run together with their noses close to the ground, shake their heads and stamp. The fly, however, in a good number of instances succeeds in depositing one or two eggs, which soon hatch and so liberate the chrysalis-like larvæ, which attach themselves to the mucous membrane of the nasal cavities, and there remain until the following spring or early summer, when they pass from this situation and drop on to the ground, where they undergo a change, and soon emerge as the mature gadfly, to again worry their victims, the sheep.

It has been supposed by some old writers that these larvæ have in some instances produced damage to the brain of their host, the sheep, but these statements were made after badly conducted or misdirected examination of the parts.

LARYNGITIS, INFLAMMATION OF THE UPPER PART OF
THE WINDPIPE OR TRACHEA,

Is not a very common disease in sheep, and when it does occur it may be greatly relieved by steaming with hot water containing some extract of belladonna, and rubbing the throat with hartshorn and oil.

BRONCHITIS, INFLAMMATION OF THE SMALLER AIR TUBES,

May be relieved by steaming in a similar manner, and by the administration of tincture of belladonna or digitalis, solution of acetate of ammonia, and sweet spirits of nitre in linseed tea or gruel. A frequent dry, short cough is the chief symptom, accompanied by difficult breathing.

CONSUMPTION, PHTHISIS, OR TUBERCULOSIS OF THE LUNGS,

Is an incurable disease, and an animal suspected of being so affected had better be at once killed.

The symptoms are wasting, and the presence of a peculiar hollow cough, quite unlike the short, dry cough of bronchitis, or the painful cough of pleurisy.

“HOOSE” OR “HUSK” (PARASITIC BRONCHITIS),

Is caused by small thread-like worms in the windpipe and bronchial tubes. The name of the worm is *Strongylus filaria*. It chiefly affects young animals under two years old, causing many deaths in some seasons.

The symptoms are general unthriftiness, the presence of a short, hacking cough when the animals affected are made to move quickly, or on first getting up after lying down, and in advanced stages diarrhoea or scouring.

Treatment must consist of removal from the field or pasture where the disease has been contracted. Liberal feeding with dry food, bran, crushed oats, cake, etc., and a dose of sulphate of iron, gentian, and common salt for each patient mixed with these daily. This treatment, with the administration of turpentine and assafœtida in linseed oil twice each week, and given when the affected sheep or lambs have been kept without food for eight or ten hours previously, will soon effect a cure, and save great loss, if the cases are taken in hand as soon as observed.

PNEUMONIA, INFLAMMATION OF THE LUNGS.

This disease is brought on by sudden climatic changes, exposure to wet, etc., especially if the food is at the same time bad or over-stimulating.

The symptoms are, feverishness, increase of temperature, quick, hard, or full pulse, and accelerated and laborious breathing.

Treatment: Bleed from jugular vein; give a dose of Epsom salts, and follow this with nitrate of potash, 1 drachm; digitalis (powdered), 1 scruple; tartarised antimony or tartar emetic, 1 scruple; and tincture of aconite, B.P., 15 minims, in linseed or oatmeal gruel, two or three times each day. Keep up the patient's strength with good nursing, and by giving new-laid eggs, milk, and gruel in small quantities frequently. If possible the sides should be rubbed with turpentine, or a mustard poultice applied.

PLEURISY OR PLEURITIS, INFLAMMATION OF THE LINING
MEMBRANE OF THE CHEST AND LUNGS.

This disease is produced by the same causes as Pneumonia, viz. sudden changes of temperature, and exposure to damp and cold (especially after shearing).

Pleurisy may be treated internally in the same way as Pneumonia (inflammation of the lungs), and in this also a good mustard plaster applied to the sides if the wool has lately been clipped, or if it is long, the wool parted and some turpentine rubbed on the skin of the sides, will have a beneficial effect in the early stages of this disease. If an attack of Pleurisy is not cut short at its commencement, lymph is thrown out from the inflamed parts causing adhesions to take place between the lungs and sides, constituting the condition known as "light-grown."

In some forms of blood poisoning the lungs undergo

marked changes, and this fact is misleading to a novice or a careless investigator, as the diseased state of the lungs is apt to be taken as the cause of all the trouble, whereas in such cases it is only the result of a changed state of the blood.

DISEASES OF THE DIGESTIVE ORGANS.

GLOSS-ANTHRAX.

It sometimes happens that the blood disease, known as Anthrax, becomes localised in the tongue and its adjacent structures, when it is known by the term Gloss-anthrax. It must be dealt with in the same way as when this disease attacks any other part of the body, instructions with regard to which are given when treating specially of Anthrax. The disease is liable to be confounded with simple Glossitis or inflammation of the tongue, which is generally due to the application of some irritant, or to injury, and readily yields to suitable treatment, which should consist of hot fomentations to the part, gargles of weak solutions of chlorate of potash and extract of belladonna.

APHTHA, OR THRUSH.

This disease of the mouth is characterised by the appearance of small pointed vesicles, which rupture, and leave ragged ulcers.

It is due to stomach derangement, the result of improper or indigestible food, and may be easily cured by the administration of a dose of Epsom salts, and chlorate of potash gargles, with a little tincture of myrrh added.

Another disease of the gums and lips is of a fungoid nature, and is sometimes very prevalent in certain districts, not only causing great loss of the sucking lambs, but the diseased condition of the lambs' mouths affects the teats

and udders of the ewes, making them very sore and inflamed, which induces the ewes to refuse letting the lambs suck. Garget or inflammation of the udder is the result, sometimes ending in the loss of the ewe.

It may be cured by a daily application of the following: sulphate of iron, 1 ounce; alum, 4 ounces; treacle, $\frac{1}{2}$ pound; water, 1 pint.

There is yet another disease of the lips of sheep, which is very common in certain seasons, especially among sheep under two years old, and which seems to be very contagious, it being of an eczematous nature.

It, too, can be cured by the lotion prescribed for the last disease, but in these cases it is well to substitute $\frac{1}{4}$ pound of glycerine for the treacle. This disease is sometimes called "Black Muzzle," from the scabby condition of the lips, etc.

CHOKING.

It sometimes happens that a sheep gets a piece of turnip or some other hard material impacted in the gullet (*œsophagus*). This must be removed either by passing a proper probang made for the purpose down the gullet, and so forcing by steady but firm pressure the mass down into the rumen, or if no such instrument be at hand, a piece of cane, whalebone, or other flexible material may be employed for the purpose.

If the offending material cannot be removed in this way, an operation may be performed by cutting down on to the impaction, removing the substance, and then stitching up the wound, but this operation is attended with considerable risk, and should never be attempted by any one except an expert; therefore its performance in the case of a sheep is very rare, and would not be likely to be attempted unless the patient was a valuable stock animal.

HOVE, HOVEN, OR BLOWN ; DISTENSION OF THE RUMEN
WITH GAS.

This usually occurs when hungry sheep are turned into young clover, or some other succulent grass, or rape, etc., especially when these are wet and an east wind is blowing.

It is due to the fermentation of the green food in the rumen or paunch, and in severe cases is rapidly fatal, causing death by suffocation, unless relief be afforded. The best means of liberating the gas in urgent cases, is either by passing a probang down the gullet into the paunch or by the introduction of a trocar and cannula (or even an ordinary pocket-knife having a long blade), by plunging it into the hollow between the last rib, the point of the hip, and the transverse processes of the lumbar vertebrae, and so allowing the gas to escape through the hole thus made.

In less severe cases a dose or two of aromatic spirits of ammonia, hyposulphite of soda, chloride of lime, chlorate of potash, or common salt will relieve the Tympany or hoven condition of the sheep.

MECHANICAL DISTENSION OF THE RUMEN (PAUNCH-BOUND).

This is not a very common affection in sheep, except when it occurs from a flock being allowed to run over wheat or barley stubbles where there is a large quantity of shed grain.

In cases occurring when the sheep are getting only ordinary food, a good brisk purgative such as Epsom salts and linseed oil containing some croton oil, or a solution of aloes, linseed oil, and treacle, followed by two or three doses of tincture of nux vomica and solution of carbonate of ammonia, will generally give relief.

In the case of a valuable animal, if medicines fail to have the desired effect, the paunch may be opened on the left side, and the food removed through the opening

afterwards, first stitching together with carbolised catgut the wound in the coats of the paunch, and then the skin should be wound with suture wire. Of course this operation is attended with considerable risk.

In cases of distension of the rumen from eating large quantities of wheat or barley, the first object must be to prevent so far as possible fermentation being set up by the grain, and this may be done by giving a full dose of carbolic acid (dissolved in glycerine and warm water), and aromatic spirits of ammonia. This should be followed in two or three hours by a good dose of linseed oil, and after this a dose of hyposulphite of soda should be administered every twelve hours for two or three days, and a second dose of linseed oil may, if it is thought necessary, be given twenty-four hours after the first.

Whenever sheep have eaten wheat or barley to excess, they must not be allowed access to water for two or three days at least, as a large draught of water causes rapid swelling of the grain, producing fatal results in a short time.

Cases of poisoning by yew may be treated in a similar manner, except that the aromatic spirits of ammonia should be repeated for several times at intervals of two or three hours only, in place of the hyposulphite of soda.

COLIC, OR GRIPE,

Is rather rarely seen in sheep. It is caused by some irritant in the stomach and bowels, such as frozen roots, the presence of worms, especially tapeworms, etc.

The symptoms are : pain, as shown by the animal being very restless, striking the belly with the hind limbs, moaning, and grating the teeth.

A draught composed of turpentine, laudanum, and linseed oil, will almost invariably give relief. Should it not do so, give a second dose of laudanum with aromatic spirits of ammonia, in some warm oatmeal gruel.

Tapeworms may be expelled by a mixture of turpentine, oil of male fern, and linseed oil, given on an empty stomach for three or four times at intervals of four or five days.

ENTERITIS. INFLAMMATION OF THE BOWELS.

This is a very common and very fatal disease affecting sheep, for although it does not run such a rapid course, in many cases, as in the horse and some other animals, it does not readily yield to treatment.

It is caused by exposure to cold, mouldy and other improper food, and the presence of worms, both round and tapeworms, in the bowels.

The symptoms are shivering, fever, a quick, hard pulse, the bowels do not act, the sufferer paws the ground, breathes laboriously, staggers, becomes very dull and often semi-conscious, usually dying in two or three days.

Treatment: Bleed in the early stages, give a dose of linseed oil, but do not repeat it, at least not for twenty-four hours; avoid all powerful purgatives, but give laudanum, subnitrate of bismuth, and tincture of aconite in a little oatmeal gruel or new milk, every four or six hours. A dose or two of hydrate of chloral may be given if the pain is very acute.

Mustard stirred with warm water and some turpentine added, should be rubbed on the abdomen.

Good careful nursing and the avoidance for several days of any indigestible food, are essentials in the successful treatment of Enteritis.

PERITONITIS. INFLAMMATION OF THE LINING MEMBRANE OF THE ABDOMEN.

Peritonitis is caused either by cold and damp or injury, and is very common after sheep have been shorn, when the weather is wet and cold, and when they are not provided with proper shelter.

Symptoms: Dulness, stiffness, loss of appetite, painful breathing, high temperature, and quick, hard, but small pulse.

Treatment: Bleed in early stages, and give sweet spirits of nitre, tincture of aconite, and tartarised antimony, every six hours until the acute symptoms abate, then omit the antimony, but give the nitre and aconite with some solution of acetate of ammonia twice daily in linseed or oatmeal gruel. A mustard plaster to the abdomen is useful in the very early stages, but it must not be repeated, nor applied in the advanced stages of this disorder, but hot moist rugs should be kept constantly applied to the abdomen until the patient shows signs of recovery, and then dry rugs must take the place of the wet ones.

Peritonitis, unless checked early in the attack, results in effusion of serum water into the abdomen, and is one of the causes of what is commonly known as "Redwater" (*Sanguineus Asinus*); another cause being a disordered state of the liver.

DIARRHEA AND DYSENTERY.

Diarrhea, or Scour, is due either to a relaxed state of the mucous membrane of the bowels, or it is caused by the presence of an irritant in some part of the intestines.

It is brought on by sudden changes in the weather, by partaking of food of an irritating or very succulent nature, such as rape, pastures containing plants of the ranunculus order, frozen swedes, excess of unripe marigolds; and above all, pastures or green field crops which have been previously eaten off with sheep at a recent date.

In simple Diarrhea there is very little or no fever present, there is no straining when the faeces are evacuated and the dung passed is simply more liquid than natural, not being stained with blood.

Treatment: The first and chief thing to be attended to is a change of food. Sainfoin is an excellent green food to give sheep or lambs suffering from Diarrhoea. Cotton-cake is also sometimes given. A dose of castor oil or linseed oil and tincture of rhubarb should first be given when treating medicinally, and this should be followed by prepared chalk 2 ounces, powdered opium 1 drachm, powdered catechu 1 ounce, peppermint water 1 pint. Mix these and give two tablespoonfuls in some cold flour gruel two or three times each day according to the severity of the symptoms. The patient's strength must be supported with raw eggs, milk, gruel, and a little elder-wine is a very useful stimulant in this disorder.

When lambs that are sucking their mothers become attacked with Diarrhoea the first step towards checking it is to attend to the diet of the dams, and it is also frequently of great advantage to give them a few doses either of hypo-sulphite of soda or bicarbonate of soda or potash. The lamb should be drenched with linseed oil and rhubarb, followed by the mixture prescribed for sheep, or sometimes lime water and laudanum given at intervals of a few hours has a very beneficial effect.

In Dysentery there is always considerable feverishness. Straining accompanies the evacuation of faeces, which are streaked with blood and mucus, and are passed very frequently, or rather, the attempt is made frequently. The same treatment as that employed in Diarrhoea may be tried: but if the disease is not checked with this, subnitrate of bismuth and opium, acetate of lead and opium, or a few doses of tannic acid may be tried.

As the weakness caused by an attack of Dysentery is often extreme, it is important that the patient receives good nursing and shelter in addition to medicinal treatment. If the patient is very feverish, tincture of aconite may be given with any of the above medicines.

DISEASES OF THE LIVER.

ROT, OR FLUKE-ROT.

Although a sheep dying with its liver in a soft, friable, or rotten condition is often said to have died of "Rot," yet the only cause of true Rot is the presence in the bile ducts of the liver of that parasite known as Fluke (*Fasciola Hepatica*).

Because Rot usually makes its appearance in sheep which have been feeding in damp, marshy places (except those near the sea) it was formerly supposed that vapours, etc., arising from such places had a miasmatic influence, and Rot was the outcome of this. It is now well known that the reason why damp land is favourable to Rot is because during one stage of its life the fluke, which is the sole cause of this mischief, inhabits the body of a certain kind or kinds of mollusc, and as this latter can only live in damp places, so Rot can only be propagated in such situations.

The symptoms in the early stages of this disorder are: rapid fattening, after which the affected animals begin to waste, the wool comes out easily, the eye has a watery appearance, there is a peculiar flaccid condition of the muscles of the loin, and often swellings appear about the head and throat.

The best way to determine whether or not a flock is attacked by Rot is to carefully examine the dung of some of the most suspicious-looking animals for the eggs of the fluke, which can be readily detected with an ordinary magnifying lens, or to kill one or two sheep and examine the liver for flukes.

Various remedies for Rot have been published; but when the disease has become sufficiently advanced to produce rapid wasting no medicinal agent, either internally or externally, has yet been discovered that will destroy the flukes without causing the death of the sheep, and as the

flukes are the actual and only cause of this affection, there is at present no known cure for the disease.

The best preventatives are: keeping sheep off suspicious ground, a liberal allowance of salt and tonics, such as sulphate of iron, gentian, and common salt given daily in some dry food of a nutritious character.

Like all other parasitic diseases it is the number of parasites which cause the mischief; many sheep may and do harbour a few flukes and are apparently none the worse for them, and it is by reason of this that so-called cures are effected. Sheep having some flukes in their livers but not sufficient to kill them, if liberally fed on good food and tonics, often survive and even get fat.

ACUTE HEPATITIS. INFLAMMATION OF THE LIVER.

This disease is generally met with in sheep that are being fed on highly nutritious food, especially if located at the time on low marshy ground.

The symptoms are dulness, loss of appetite, costiveness, feverishness, yellowness of the skin and membranes of the eye; there is tenderness on pressure on the right side, and sometimes lameness of the right fore-leg.

Treatment : Bleeding is very beneficial in the early stages ; purgatives of Epsom salts, taraxacum, tincture of aconite, and gentian, accompanied by mustard and turpentine poultice on the right side behind the chest. It is also necessary to keep the patient from exposure to inclement weather or excessive heat.

Rock-salt placed within reach of sheep tends to prevent this disorder, and it is also useful as assisting in effecting a cure.

CHRONIC INFLAMMATION OF THE LIVER.

Chronic disease of the liver, commencing with a sub-acute form of inflammation, and ending in complete disorganisation (rotting) of this organ, often accompanied by

or causing an accumulation of serum (water) in the abdomen, and so producing one form of the so-called Redwater, is very common among sheep. One of the chief causes of this affection is feeding on stained or stale ground, that is, ground which has previously been run over by sheep at a recent date. Another cause is poor, watery food, especially during bad weather, and it is sometimes a sequel to an attack of Acute Hepatitis.

The symptoms are loss of appetite, wasting, listlessness, and yellowness of the membranes of the eye, etc.

The treatment must consist of a change of food, the allowance of rock-salt to lick, the administration of a dose or two of Epsom salts, followed by gentian, taraxacum, and carbonate of iron, given once or twice each day, and some sweet spirits of nitre and nitro-hydrochloric acid (dilute) given once daily in a little oatmeal gruel. An occasional dose of calomel (subchloride of mercury) and opium is also very useful in cases of this character.

INFLAMMATION OF THE SPLEEN OR MILT.

This is said sometimes to occur as a distinct disease, but it is very rare, and when this organ is the object of an apparently inflammatory attack, it is nearly always as an accompaniment to some other disease, such as some form of blood poisoning.

DISEASES OF THE URINARY ORGANS.

The most frequent and important of these is Cystitis or Inflammation of the Bladder.

This disease is somewhat common in the male sex, but rare in the female; the reason of this being that Cystitis is in most cases brought on by some obstruction in the urine passage, and this being longer and smaller in the male than in the female, it becomes more readily the starting-point of this disease.

It is generally met with in sheep that are receiving a rather large supply of artificial food, and especially such as are getting fully ripe mangels at the same time; consequently it is more common in the late spring and early summer months than at other seasons.

The actual cause in these cases is the accumulation of crystalline material in the veriform appendage to the penis, commonly called "the worm"; and this, besides actually blocking the passage, so irritates the mucous membrane that acute inflammation of the urine passage is set up, which rapidly extends to the bladder, and this, owing to the retention of the urine, becomes distended, and in some cases actually ruptures.

The symptoms are those of acute suffering, the animal constantly shifts his hind legs, strains, attempts to urinate, the abdomen is tense and hard, breathing quick and painful, and the back is arched suddenly for a few seconds.

Treatment: The removal of the offending agent by cutting down on it, and taking it out, then washing the parts with warm water containing a little Condy's Fluid, to remove any gritty matter that may remain. After this operation a dose of castor oil and aloes in solution should be given, followed by a dose, night and morning for a few days, of sweet spirits of nitre, solution of acetate of ammonia, and tincture of aconite, in a solution of gum arabic and linseed tea. The food must be of a digestible nature, of course avoiding all roots; and while the appetite is much impaired, oatmeal and linseed gruel must be given two or three times daily.

Those cases of Cystitis which occur independently of an obstruction and as a result of diseased kidneys, or an excessively irritating condition of the urine, or from the presence of calculi (stones) in the bladder, may also be treated in the same way as above described, except, of course, the cutting into the "worm."

DISEASES OF THE SKIN.

SCAB

Is about the only skin disease of sheep of great importance to the flock-owner, besides *Variola Ovis*, which has been already dealt with, and those which are due to the larger parasites, such as ticks, lice, etc., and which are so well known as to need no description.

Scab is due to another minute parasite, which burrows under the skin, and causes intense itching.

The symptoms are, constant rubbing against hurdles, posts, trees, fences, etc., the sheep biting itself, and the presence of pustules, which are soon ruptured, leaving a dry, brownish scab, the part being denuded of wool.

The existence or supposed existence of Scab in sheep must be at once reported to the police, this disease being within the operation of the Contagious Diseases (Animals) Act, and their inspector's instructions as to method of cure, etc., must be strictly carried out.

DISEASES OF THE FEET.

FOOT-ROT.

This troublesome disease is the source of great loss every year to flock-owners, and for some time past investigations as to its real nature have been going on, which have resulted in the discovery (for years asserted by many practical men) that true Foot-Rot is a contagious disease, some soils being more suitable to the development of the disease-producing virus than others, this accounting for the fact that sheep suffering from true Foot-Rot will frequently recover when put on soil that is unsuitable to the development of the disease-producing germ or virus.

The symptoms of Foot-Rot are well known to flock-owners and shepherds; nevertheless other diseases and in-

juries to the feet are too frequently, through carelessness in examining the feet, confounded with, and spoken of as Foot-Rot.

The treatment, too, of Foot-Rot is generally entrusted to shepherds, each of whom has his pet cure, and indeed, the effectual eradication of this pest from a flock depends more upon the mode in which the dressing is employed than which of the many agents employed is selected for the purpose, nearly all the curative materials used being caustics or powerful astringents, such as carbolic acid, solution of chloride of zinc, butyr of antimony (alone or mixed with tar), sulphuric acid and tar, sulphate of copper (blue vitriol), sulphate of zinc, preparations of mercury, alum, and many others, most of these (besides numerous patent remedies) being effectual when properly applied. One great essential in dressing diseased feet is the careful but not ruthless removal of all diseased parts that can be readily cut away with a knife.

In mild attacks of Foot-Rot, and where a great number of sheep are suffering at one time, a convenient method of dressing is that known as "driving"; that is, the sheep are driven through a trough containing some powerful curative agent, such as a strong solution of sulphate of copper, or carbolic acid in solution, the trough being shallow, but just sufficiently deep to allow the contained liquid to come up to the top, but not over the hoofs of the sheep.

INFLAMMATION OF THE INTERDIGITAL CANAL.

It sometimes happens that the blind tube or canal which exists at the front of each sheep's foot, having an opening about the size of a crow's quill between the hoofs or digits at the front, becomes filled with sharp grit or sand, which sets up such an amount of inflammation, lameness, tenderness, and swelling that it is mistaken for Foot-Rot. Careful examination will, however, soon reveal the true nature of the affection, and, unless it is a long-standing case, careful

removal of the offending material, followed by a few applications of some cooling ointment, such as oxide of zinc ointment, or some lead lotion, will soon effect a cure.

In bad cases of long standing it is necessary to poultice the feet, and use an astringent dressing, such as a weak solution of sulphate of zinc, or sulphate of copper, to check the granulations (proud flesh) which appear.

There is also an eczematous eruption which takes place around the coronet and between the digits which is sometimes called Foot-Rot, although it really is totally different from that disease. It generally occurs in fattening sheep that are getting a large supply of stimulating food, and it is attended with a considerable amount of fever.

A few doses of Epsom salts, nitrate of potash, and tincture of aconite internally, and the sores dressed with an ointment composed of equal parts of oxide of zinc ointment and carbolic acid ointment, will quickly give relief. Of course it is necessary also to lower the quality of the food.

SPURIOUS FOOT-ROT

Is a name sometimes given to a diseased condition of sheep's feet, caused by the introduction of sand and grit through cracks in the walls of the hoofs, or worn and damaged places in the sole.

The symptoms are very similar to those present in true Foot-Rot, but the presence of the sand or grit in the sensitive parts of the foot reveals its true nature and cause, removal of which, followed by the application of tincture of myrrh containing a small quantity of carbolic acid, and the prevention of the recurrence of this state of things, restore the patients to a normal condition.

After an attack of Foot-and-Mouth Disease sheep's feet are liable to suffer very considerably, the hoofs in some cases coming quite off; it is wise, therefore, after an attack of this disease to give the feet careful attention, by which a

great loss from permanently lame sheep may often be averted.

GARGET. INFLAMMATION OF THE UDDER.

There are two chief causes of Inflammation of the Udder in ewes, the first being severe chill from lying on damp, cold ground ; the other is sore teats brought on by cold east winds, or by soreness of the mouths of the lambs, which induces the ewe to prevent the lamb sucking as much as possible, whereby the blood-vessels in the udder become congested, and inflammation follows.

In this, as in all other diseases, our first aim should be to remove the cause of mischief, or, where this is impossible, to protect the sufferers from its influence.

The symptoms of Garget are a swollen, hot, and tender condition of one or both sides of the udder, the ewe is dull and does not feed well, is stiff in her movements and feverish.

Treatment must commence with protection of the patient from climatic and other influences that are aggravating the disease ; the administration of a dose of Epsom salts, followed by bicarbonate of soda and tincture of aconite, once or twice each day according to the severity of the symptoms.

The udder should be well bathed twice each day with warm water, wiped dry each time, and the following, applied with gentle friction : laudanum, 1 ounce ; camphorated oil, 5 ounces. Mix thoroughly. When the inflammation has subsided half an ounce of hartshorn may be added to the above, or the udder may be rubbed once daily with compound soap liniment and once with the camphorated oil and laudanum.

Garget sometimes runs to a gangrenous state, when it is commonly known as " Black Garget," owing to the dark purple colour which the affected part of the udder assumes, which also becomes cold and insensible to feeling ; the

constitutional symptoms are increased, and often death takes place by the gangrenous material so affecting the blood that blood poisoning takes place.

When "Black Garget" sets in, the affected udder, or part of udder, should be freely cut into and then well bathed with hot water, the wounds being dressed with white oils. Hyposulphite of soda, chlorate of potash, and quinine should be given three or four times each day, and the patient's strength kept up with linseed and oatmeal gruel, milk, eggs, etc., to which a little whisky (about half a wineglassful) may be added with advantage, two or three times daily.

DISEASES OF YOUNG SHEEP.

Young lambs are sometimes affected with a scrofulous disease known as joint-evil, so called because the joints are stiff, swell, and contain a straw-coloured fluid. The liver also is affected, and becomes much disorganised, producing death in many instances.

It is an hereditary disease, often aggravated by climatic influences, treatment being of but little avail.

Young sheep are often infested with worms in the alimentary canal, which when present in any considerable number cause emaciation and ultimately death.

The round worms, of which there are several varieties, can be got rid of by a few doses of santonine, turpentine, and linseed oil given after the sheep have been kept without food for several hours previously, and the administration of sulphate of iron and common salt in some dry food such as bran, crushed oats, and hay-chaff, each day.

When tape-worms are present, which can easily be detected by the segments or joints passing away with the dung, some powdered areca nut or liquid extract of male fern should be given instead of santonine, with turpentine and linseed oil, and in the same manner.

DOSES OF DRUGS PRESCRIBED IN THIS WORK.

The doses here given are for a full-grown sheep of average size and stamina.

Name of Drug.				Dose.
Iodide of Potassium	...	...	...	$\frac{1}{2}$ drachm.
Dialysed Iron	...	...	...	1 "
Sulphate of Iron	...	...	...	20 to 30 grains.
Bromide of Potassium	...	...	...	1,, 2 drachms.
Tincture of Aconite, B.P.	...	...	...	10,, 15 minims.
Epsom Salts, as a Purgative	...	...	...	1,, 2 oz.
" " Febrifuge	...	...	...	About $\frac{1}{2}$ oz.
Potassio-Tartrate of Antimony (Tartar Emetic)				10 to 12 grains.
Tincture of Belladonna	...	...	...	$\frac{1}{2}$, 1 drachm.
Extract " "	...	...	...	10,, 15 grains.
Hydrate of Chloral	...	...	...	$\frac{1}{2}$, 1 drachm.
Hydrocyanic Acid (Prussic Acid), B.P.	...	...	...	10,, 15 minims.
Nitrate of Amyl	...	...	...	5,, 10 "
Nitrate of Potash (Saltpetre)	...	...	...	$\frac{1}{2}$, 1 drachm.
Spirit of Nitrous Ether (Sweet Spirits of Nitre)				4,, 6 drachms.
Solution of Acetate of Ammonia	...	...	...	1,, 3 oz.
Chlorate of Potash	...	...	...	20,, 40 grains.
Sulphate of Quinine	...	...	...	10,, 15 "
Salicylate of Soda	...	...	...	20,, 40 "
Salicylic Acid	...	...	...	10,, 30 "
Tincture of Colchicum	...	...	...	1,, 2 drachms.
Bicarbonate of Soda	...	...	...	1,, 2 "
Gentian (in powder)	...	...	...	1 drachm.
Tincture of Gentian	...	...	...	2 drachms.
Tincture of Opium (Laudanum)				$\frac{1}{2}$ to 1 oz.
Tincture of Digitalis	...	...	...	$\frac{1}{2}$, 1 drachm.
Turpentine	...	...	...	$\frac{1}{2}$ oz.
Assafetida	...	...	...	1 drachm.
Aromatic Spirits of Ammonia	...	...	...	2 to 4 drachms.
Hyposulphite of Soda	...	...	...	2,, 6 "
Chloride of Lime	...	...	...	1,, 2 "
Common Salt (Chloride of Sodium) as a Tonic, etc.	1,, 3	,,		
" " as a Purgative	...	...	...	1,, 3 oz.
Linseed Oil	...	...	...	3,, 6 "
Croton Oil	...	...	...	2,, 5 minims.
Tincture of Nux Vomica	...	...	...	1,, 2 drachms.
Carbonate of Ammonia	...	...	...	$\frac{1}{2}$, 1 drachm.
Carbolic Acid, dissolved in Glycerine	...	...	...	5,, 15 grains.
Liquid Extract of Male Fern	...	...	...	2 drachms.

Name of Drug.	Dose.
Subnitrate of Bismuth ...	1 to 2 drachms.
Castor Oil ...	2 , , 4 oz.
Tincture of Rhubarb ...	2 , , 6 drachms.
Acetate of Lead ...	10 , , 20 grains.
Opium (powdered) ...	20 , , 40 , ,
Tannic Acid ...	10 , , 20 , ,
Taraxacum (Extract of) ...	20 , , 40 , ,
Carbonate of Iron ...	20 , , 30 , ,
Nitro-Hydrochloric Acid (dilute)	20 , , 30 minimis.
Calomel (Subchloride of Mercury)	10 , , 20 grains.
Solution of Aloes ...	1 , , 6 oz.
Quinine ...	10 , , 15 grains.
Santonine ...	10 , , 15 , ,

A good antiseptic liquid for injection in the womb, and for the disinfection of hands, instruments, etc., or for washing out foul wounds, is made as follows :

Bichloride of mercury, $2\frac{1}{2}$ drachms ; hydrochloric acid, $\frac{1}{2}$ ounces ; rain water, 10 pints. Dissolve the mercury in the acid and water.

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